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MIND

A QUARTERLY REVIEW

OF

PSYCHOLOGY AND PHILOSOPHY.

I.—STATISTICS OF MENTAL IMAGERY.

An outline is given in the following memoir of some of the earlier results of an inquiry which I am still prosecuting, and a comparatively new statistical process will be used in it for the first time in dealing with psychological data. It is that which I described under the title of "Statistics by Intercomparison" in the *Philosophical Magazine* of Jany., 1875.

The larger object of my inquiry is to elicit facts that shall define the natural varieties of mental disposition in the two sexes and in different races, and afford trustworthy data as to the relative frequency with which different faculties are inherited in different degrees. The particular branch of the inquiry to which this memoir refers, is Mental Imagery; that is to say, I desire to define the different degrees of vividness with which different persons have the faculty of recalling familiar scenes under the form of mental pictures, and the peculiarities of the mental visions of different persons. The first questions that I put referred to the illumination, definition and colouring of the mental image, and they were framed as follows (I quote from my second and revised schedule of questions):—

"Before addressing yourself to any of the Questions on the opposite page, think of some definite object—suppose it is your breakfast-table as you sat down to it this morning—and consider carefully the picture that rises before your mind's eye.

1. *Illumination.*—Is the image dim or fairly clear? Is its brightness comparable to that of the actual scene?

2. *Definition.*—Are all the objects pretty well defined at the same time, or is the place of sharpest definition at any one moment more contracted than it is in a real scene?

3. *Colouring.*—Are the colours of the china, of the toast, bread-crust, mustard, meat, parsley, or whatever may have been on the table, quite distinct and natural?"

There were many other questions besides these, of which I defer mention for the moment.

The first results of my inquiry amazed me. I had begun by questioning friends in the scientific world, as they were the most likely class of men to give accurate answers concerning this faculty of visualising, to which novelists and poets continually allude, which has left an abiding mark on the vocabularies of every language, and which supplies the material out of which dreams and the well-known hallucinations of sick people are built up.

To my astonishment, I found that the great majority of the men of science to whom I first applied, protested that mental imagery was unknown to them, and they looked on me as fanciful and fantastic in supposing that the words 'mental imagery' really expressed what I believed everybody supposed them to mean. They had no more notion of its true nature than a colour-blind man who has not discerned his defect has of the nature of colour. They had a mental deficiency of which they were unaware, and naturally enough supposed that those who were normally endowed, were romancing. To illustrate their mental attitude it will be sufficient to quote a few lines from the letter of one of my correspondents, who writes:—

"These questions presuppose assent to some sort of a proposition regarding the 'mind's eye' and the 'images' which it sees. . . . . This points to some initial fallacy. . . . . It is only by a figure of speech that I can describe my recollection of a scene as a 'mental image' which I can 'see' with my 'mind's eye'. . . . . I do not see it . . . any more than a man sees the thousand lines of Sophocles which under due pressure he is ready to repeat. The memory possesses it, &c."

Much the same result followed some inquiries made for me by a friend among members of the French Institute.

On the other hand, when I spoke to persons whom I met in general society, I found an entirely different disposition to prevail. Many men and a yet larger number of women, and many boys and girls, declared that they habitually saw mental imagery, and that it was perfectly distinct to them and full of colour.

The more I pressed and cross-questioned them, professing myself to be incredulous, the more obvious was the truth of their first assertions. They described their imagery in minute detail, and they spoke in a tone of surprise at my apparent hesitation in accepting what they said. I felt that I myself should have spoken exactly as they did if I had been describing a scene that lay before my eyes, in broad daylight, to a blind man who persisted in doubting the reality of vision. Reassured by this, I recommenced to inquire among scientific men, and soon found scattered instances of what I sought, though in by no means the same abundance as elsewhere. I then circulated my questions more generally among my friends, and so obtained the replies that are the main subject of this memoir. The replies were from persons of both sexes and of various ages, but I shall confine my remarks in this necessarily brief memoir to the experiences derived from the male sex alone.

I have also received batches of answers from various educational establishments, and shall here make use of those sent by the Science Master of the Charterhouse, Mr. W. H. Poole, which he obtained from all the boys who attended his classes, after fully explaining the meaning of the questions, and interesting the boys in them. They have the merit of returns derived from a general census, which my other data lack, because I cannot for a moment suppose that the writers of them are a haphazard proportion of those to whom they were sent. Indeed, I know some men who, disavowing all possession of the power, cared to send no returns at all, and many more who possessed it in too faint a degree to enable them to express what their experiences really were, in a manner satisfactory to themselves. Considerable similarity in the general style of the replies will however be observed between the two sets of returns, and I may add that they accord in this respect with the oral information I have elsewhere obtained. The conformity of replies from so many different sources, the fact of their apparent trustworthiness being on the whole much increased by cross-examination (though I could give one or two amusing instances of break-down), and the evident effort made to give accurate answers, have convinced me that it is a much easier matter than I had anticipated to obtain trustworthy replies to psychological questions. Many persons, especially women and intelligent children, take pleasure in introspection, and strive their very best to explain their mental processes. I think that a delight in self-dissection must be a strong ingredient in the pleasure that many are said to take in confessing themselves to priests.

Here then are two rather notable results: the one is the proved facility of obtaining statistical insight into the processes of other

persons' minds; and the other is that scientific men as a class have feeble powers of visual representation. There is no doubt whatever on the latter point, however it may be accounted for. My own conclusion is, that an over-readiness to perceive clear mental pictures is antagonistic to the acquirement of habits of highly generalised and abstract thought, and that if the faculty of producing them was ever possessed by men who think hard, it is very apt to be lost by disuse. The highest minds are probably those in which it is not lost, but subordinated, and is ready for use on suitable occasions. I am however bound to say, that the missing faculty seems to be replaced so serviceably by other modes of conception, chiefly I believe connected with the motor sense, that men who declare themselves entirely deficient in the power of seeing mental pictures can nevertheless give life-like descriptions of what they have seen, and can otherwise express themselves as if they were gifted with a vivid visual imagination. They can also become painters of the rank of Royal Academicians.

The facts I am now about to relate, are obtained from the returns of 100 adult men, of whom 19 are Fellows of the Royal Society, mostly of very high repute, and at least twice, and I think I may say three times, as many more are persons of distinction in various kinds of intellectual work. As already remarked, these returns taken by themselves, do not profess to be of service in a *general* statistical sense, but they are of much importance in showing how men of exceptional accuracy express themselves when they are speaking of mental imagery. They also testify to the variety of experiences to be met with in a moderately large circle. I will begin by giving a few cases of the highest, of the medium, and of the lowest order of the faculty of visualising. The hundred returns were first classified according to the order of the faculty, as judged from the whole of what was said in them, and all I knew from other sources of the writers; and the number prefixed to each quotation shows its place in the class-list.

Vividness of Mental Imagery.

(From returns furnished by 100 men, at least half of whom are distinguished in science or in other fields of intellectual work.)

Cases where the faculty is very high.

1. Brilliant, distinct, never blotchy.
2. Quite comparable to the real object. I feel as though I was dazzled, *e.g.*, when recalling the sun to my mental vision.
3. In some instances quite as bright as an actual scene.
4. Brightness as in the actual scene.
5. Thinking of the breakfast table this morning, all the objects in my mental picture are as bright as the actual scene.

6. The image once seen is perfectly clear and bright.

7. Brightness at first quite comparable to actual scene.

8. The mental image appears to correspond in all respects with reality. I think it is as clear as the actual scene.

9. The brightness is perfectly comparable to that of the real scene.

10. I think the illumination of the imaginary image is nearly equal to that of the real one.

11. All clear and bright; all the objects seem to me well defined at the same time.

12. I can see my breakfast table or any equally familiar thing with my mind's eye, quite as well in all particulars as I can do if the reality is before me.

Cases where the faculty is mediocre.

46. Fairly clear and not incomparable in illumination with that of the real scene, especially when I first catch it. Apt to become fainter when more particularly attended to.

47. Fairly clear, not quite comparable to that of the actual scene. Some objects are more sharply defined than others, the more familiar objects coming more distinctly in my mind.

48. Fairly clear as a general image; details rather misty.

49. Fairly clear, but not equal to the scene. Defined, but not sharply; not all seen with equal clearness.

50. Fairly clear. Brightness probably at least one-half to two-thirds of original. [The writer is a physiologist.] Definition varies very much, one or two objects being much more distinct than the others, but the latter come out clearly if attention be paid to them.

51. Image of my breakfast table fairly clear, but not quite so bright as the reality. Altogether it is pretty well defined; the part where I sit and its surroundings are pretty well so.

52. Fairly clear, but brightness not comparable to that of the actual scene. The objects are sharply defined; some of them are salient, and others insignificant and dim, but by separate efforts I can take a visualised inventory of the whole table.

53. Details of breakfast table *when the scene is reflected on*, are fairly defined and complete, but I have had a familiarity of many years with my own breakfast table, and the above would not be the case with a table seen casually unless there were some striking peculiarity in it.

54. I can recall any single object or group of objects, but not the whole table at once. The things recalled are generally clearly defined. Our table is a long one; I can in my mind pass my eyes all down the table and see the different things distinctly, but not the whole table at once.

Cases where the faculty is at the lowest.

89. Dim and indistinct, yet I can give an account of this morning's breakfast table;—split herrings, broiled chickens, bacon, rolls, rather light coloured marmalade, faint green plates with stiff pink flowers, the girls' dresses, &c., &c. I can also tell where all the dishes were, and where the people sat (I was on a visit). But my imagination is seldom pictorial except between sleeping and waking, when I sometimes see rather vivid forms.

90. Dim and not comparable in brightness to the real scene. Badly defined with blotches of light; very incomplete.

91. Dim, poor definition; could not sketch from it. I have a difficulty in seeing two images together.

92. Usually very dim. I cannot speak of its brightness, but only of its faintness. Not well defined and very incomplete.

93. Dim, imperfect.

94. I am very rarely able to recall any object whatever with any sort of distinctness. Very occasionally an object or image will recall itself, but even then it is more like a generalised image than an individual image. I seem to be almost destitute of visualising power, as under control.

95. No power of visualising. Between sleeping and waking, in illness and in health, with eyes closed, some remarkable scenes have occasionally presented themselves, but I cannot recall them when awake with eyes open, and by daylight, or under any circumstances whatever when a copy could be made of them on paper. I have drawn both men and places many days or weeks after seeing them, but it was by an effort of memory acting on study at the time, and assisted by trial and error on the paper or canvas, whether in black, yellow or colour, afterwards.

96. It is only as a figure of speech that I can describe my recollection of a scene as a 'mental image' which I can 'see' with my 'mind's eye.' . . The memory possesses it, and the mind can at will roam over the whole, or study minutely any part.

97. No individual objects, only a general idea of a very uncertain kind.

98. No. My memory is not of the nature of a spontaneous vision, though I remember well where a word occurs in a page, how furniture looks in a room, &c. The ideas are not felt to be mental pictures, but rather the symbols of facts.

99. Extremely dim. The impressions are in all respects so dim, vague and transient, that I doubt whether they can reasonably be called images. They are incomparably less than those of dreams.

100. My powers are zero. To my consciousness there is almost no association of memory with objective visual impressions. I recollect the breakfast table, but do not see it.

These quotations clearly show the great variety of natural powers of visual representation. I will proceed to examine the subject more closely, and to compare the returns from the 100 men with those from the Charterhouse boys, on the principle of my "Statistics by Intercomparison," which I must first explain at sufficient length.

There are many who deny to statistics the title of a science, and say that it is a mere collection of facts. For my part I think that there is such a thing as a science of statistics, though its field is narrowed almost to a point. Its object is to *discover methods* of epitomising a great, even an infinite, amount of variation in a compact form. To fix the ideas, it is well to take as an example the heights of men, in which case the science of statistics enables us to specify, by means of a very few figures, the conditions of stature that characterise the whole of the adult male inhabitants, say of the British Isles. These figures will suffice to inform us that there are so many per cent. between such and such heights, and so many between such other heights, giving us material whence we can answer any such question as this:—Out of 1000 men how many are we likely to find between 5 feet and 6 feet in height? If the figures do not give the answer directly, we can find it by interpolation and easy calculation from them. So again, if we wish to compare the heights of

Englishmen and Frenchmen, statistics show how to obtain the average height of the two races, and the two averages may be readily compared, which goes a considerable way towards answering the question; or, if we wish it, we may compare very much more in detail, all the facts that are needed for the purpose being contained in the few figures of which I spoke.

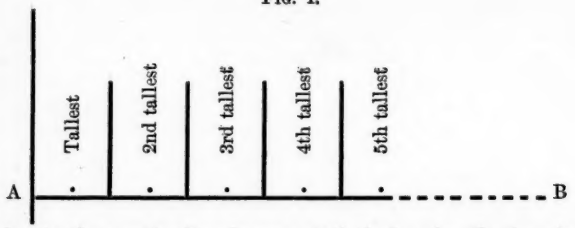
But all these operations require the use of an *external standard*. The men must be separately measured by a foot-rule before their measurements can be classified, and the same need of an external standard of measurement is felt in every case with which the ordinary methods of statistics profess to deal. The standard of measurement may be that of time, weight, length, price, temperature, &c., but without the almanack or watch, the scales, the foot-rule, the coin, the thermometer, &c., statistics of the ordinary form to which I refer, cannot be made.

In my process, there is no necessity for an external standard. It clearly comes to the same thing whether I take eleven men and, measuring them one against another, range them in order, beginning with the highest and ending with the lowest, or if I measure them separately with a foot-measure, and range them in the order of the magnitude of the measurements recorded in my note-book. In each case the tallest man will stand first, the next tallest second, and so on to the last. In each case the same man will occupy the sixth or *middlemost* place, and will therefore represent the *medium* height of the whole of them. I do not wish to imply that 'medium' is identical with 'mean' or 'average,' for it is not necessarily so. But I do say that the word medium may be strictly defined, and therefore if we wish to compare the heights of Englishmen with Frenchmen, we shall proceed just as scientifically if we compare their medium heights as if we compare their average heights. Now it will be observed that we have got the medium heights without a foot-rule or any external standard; we have done so altogether by the method of intercomparison. In the particular question with which we are dealing I have classified the answers according to the degree of vividness of mental imagery to which they depose, and I pick out the middlemost answer and say that the description given in it describes the medium vividness of mental imagery in the group under discussion. If I want to compare two such groups I compare their respective middlemost answers, and judge which of the two implies the higher faculty.

Thus much is a great gain, yet I claim to effect more; but in order to explain what that is I must return to the illustration of heights of men. Suppose them as before to be all arranged in order of their stature, at equal distances apart on a long line A B, with their backs turned towards us. If there

be a thousand men, we must suppose A B to be divided into 1000 equal parts, and a man to be set in the middle of each part. The tallest man will have A close to his left, and the shortest man will have B close to his right. They will form a series as shewn in Fig. I., where the subdivisions of A B are indicated by the vertical lines, and the positions where the men are standing are shown by the dots half-way between those lines.

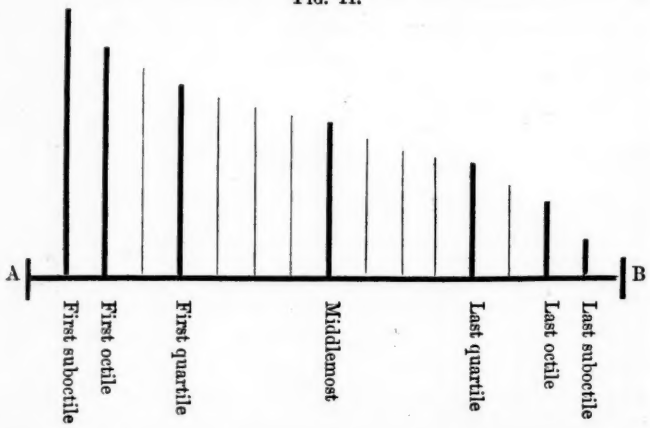
FIG. I.



Owing to the continuity of every statistical series, the imaginary line drawn along the tops of the heads of the men will form a regular curve, and if we can record this curve we shall be furnished with data whereby to ascertain the height of every man in the whole series. Drawing such a curve for Englishmen and another for Frenchmen, and superimposing the two, we should be able to compare the statures of the two nations in the minutest particulars.

A curve is recorded by measuring its ordinates. If we divide A B by a sufficient number of equi-distant subdivisions and measure the ordinates at each of them as has been done in Fig.

FIG. II.



II. (where the ordinates only are shewn, and not the curve), we can at any time plot them to scale, and by tracing a free line touching their tops, we can with more or less precision, reproduce the curve. It happens, however, from the peculiar character of all statistical curves, that ordinates at equal distances apart are by no means the most suitable. The mediocre cases are always so numerous that the curve flows in a steady and almost straight line about its middle, and it becomes a waste of effort to take many measurements thereabouts. On the other hand its shape varies rapidly at either end, and there the observations ought to be numerous. The most suitable stations are those which correspond to ordinates that differ in height by *equal degrees*, and these places admit of being discovered by *à priori* considerations on certain general suppositions.[1]

We shall however do well to ignore those minutiæ on which I laid much stress in the Memoir, and adopt the simpler plan of successive subdivisions of A B, and of measuring the ordinates shown by darkened lines in Fig. II., and severally named there as 'middlemost,' first and last 'quartile,' first and last 'octile,' and first and last 'suboctile'. This is far enough for our present wants, though the system admits of indefinite extension. By measuring the 'ordinate,' I mean measuring the 'man' whose place in the series is nearest to the true position of that ordinate. Absolute coincidence is not needed in such rude work as this; thus in a series of 100 men either the 50th or the 51st will do duty for the middlemost. The places I have actually taken in the series of 100 men for the several stations, are, the 6th and 94th for the first and last suboctiles, the 12th and 88th for the octiles, the 25th and 75th for the quartiles, and the 50th for the middlemost.

Seven men thus become the efficient representatives of a very large class. It will be found as a general rule that these seven selected representatives will differ each from the next by approximately *equal intervals*, the difference between the suboctile and the octile being usually about the same as that between the octile and quartile, and between the quartile and the middlemost.

[1] These are discussed in the Memoir already referred to, "Statistics by Intercomparison," by myself, in *Phil. Mag.*, Jan., 1875, but there are some errors, and also some appearances of error owing to faults of expression, in that article, which were first pointed out to me by Mr. J. W. L. Glaisher. There is a full mathematical discussion bearing on the matter in a memoir by Mr. D. McAlister in the *Proceedings of the Royal Society*, 1879, on the "Law of the Geometric Mean," to which and to the immediately preceding paper by myself on the "Geometric Mean," I would refer the mathematical reader. Mr. J. W. L. Glaisher has also taken the subject in hand and calculated tables, and I trust that his memoir thereon may before long be published.

As a matter of interest, and for the chance of finding very exceptional cases, I also record the highest and the lowest of the series, but it must be clearly understood that these have no solid value for purposes of comparison. In the first place, their position as ordinates is uncertain unless the number of the group of cases is given, for when the number is large the position of the highest and lowest will be nearer to A and B respectively than when it is small. In the second place, the highest and lowest being outside cases, they are more liable to be of an exceptional character than any of those which stand between neighbours, one on either hand of it.

The comparison of any two groups is made by collating their seven representatives each to each, the first suboctile of the one with the first suboctile of the other, the first octile with the first octile, the first quartile with the first quartile, and so on. I also collate the highest of each, and again the lowest of each, as a mere matter of interest, but not as an accurate statistical operation, for the reasons already given.

It is possible that I may be thought to have somewhat loosely expressed myself under the necessity of foregoing the use of technical terms, but the mathematical reader who demands precision of statement will understand me, while it would require a treatise and much study to make the mathematical substratum of my method perfectly intelligible to a person who was not familiar with the laws of 'Probabilities' and 'Frequency of Error'.

In the following comparison between the 100 Adult Englishmen and the 172 Charterhouse boys, I have divided the latter into two groups, to serve as a check upon one another. Group A includes boys of the four upper classes in the school, group B those of the five lower classes. I have combined their replies as to Illumination and Definition under the single head of 'Vividness,' and have taken no editorial liberties whatever except of the most pardonable description. It is wonderful how well and graphically the boys write, and how much individual character is shown in their answers.

Vividness of Imagery.

HIGHEST.

Adult Males.—Brilliant, distinct, never blotchy.

Charterhouse A.—The image is perfectly clear. I can see every feature in every one's face and everything on the table with great clearness. The light is quite as bright as reality.

Charterhouse B.—The image that arises in my mind is perfectly clear. The brightness is decidedly comparable to that of the real scene, for I can see in my mind's eye just as well as if I was beholding the scene with my real eye.

FIRST SUBOCTILE.

Adult Males.—The image once seen is perfectly clear and bright.

Charterhouse A.—It is very clear and is as bright as it actually was. Everything occurs most distinctly. I can imagine everything at once, but can think a great deal more clearly by thinking more on a particular object.

Charterhouse B.—I see it exactly as it was, all clearly defined just as it was.

FIRST OCTILE.

Adult Males.—I can see my breakfast table or any equally familiar thing with my mind's eye quite as well in all particulars as I can do if the reality is before me.

Charterhouse A.—To me the picture seems quite clear and the brightness equal to the real scene. I cannot see the whole scene at the same instant, but I see one thing at once and can turn my eye mentally to another object very quickly, so that I soon get the whole scene before my mind.

Charterhouse B.—Fairly clear. I cannot see everything at the same time, but what I do see seems almost real.

FIRST QUARTILE.

Adult Males.—Fairly clear; illumination of actual scene is fairly represented. Well defined. Parts do not obtrude themselves, but attention has to be directed to different points in succession to call up the whole.

Charterhouse A.—The image is fairly clear, but its brightness is dimmer than the actual. The objects are mostly defined clearly and at the same time.

Charterhouse B.—Fairly clear, the objects are pretty well defined at the same time.

MIDDLEMOST.

Adult Males.—Fairly clear. Brightness probably at least from one-half to two-thirds of the original. Definition varies very much, one or two objects being much more distinct than the others, but the latter come out clearly if attention be paid to them.

Charterhouse A.—The image is fairly clear, but its brightness is not comparable to that of the actual scene. The objects are pretty well defined at the same time.

Charterhouse B.—The image is pretty clear, but not so clear as the actual thing. I cannot take in the whole table at once, and I cannot see more than three plates at once, and when I try to see both ends of the table I cannot see anything of the middle. I can see nothing beyond the table, but the table itself seems to stand out from the distance beyond.

LAST QUARTILE.

Adult Males.—Dim, certainly not comparable to the actual scene. I have to think separately of the several things on the table to bring them clearly before the mind's eye, and when I think of some things the others fade away in confusion.

Charterhouse A.—The image is fairly clear. I cannot see everything at once, but as I think of them they come clearly before me. The objects are not all defined at the same time, and the place of sharpest definition is more contracted than in real scene.

Charterhouse B.—If I think of any particular thing without the others, it seems clear; all at once, are not clear.

LAST OCTILE.

Adult Males.—Dim and not comparable in brightness to the real scene.

Badly defined with blotches of light; very incomplete; very little of one object is seen at one time.

Charterhouse A.—I can call up to my mind the picture of the breakfast table in every detail, but seem to see everything through a darkened pane of glass. I see just the same number of people, plates, &c., the whole time, provided of course that I do not change my idea of the scene to any great degree.

Charterhouse B.—Rather dim; the objects are pretty well defined.

LAST SUBOCTILE.

Adult Males.—I am very rarely able to recall any object whatever with any sort of distinctness. Very occasionally an object or image will recall itself, but even then it is more like a generalised image than an individual one. I seem to be almost destitute of visualising power as under control.

Charterhouse A.—The image is dim, dark, and smaller than the actual scene, and the objects nearest to me show most distinctly. The whole picture is more or less of a dark green tint.

Charterhouse B.—Dim. The place of sharpest definition is more contracted than in a real scene.

LOWEST.

Adult Males.—My powers are zero. To my consciousness there is almost no association of memory with objective visual impressions. I recollect the table, but do not see it.

Charterhouse A.—Image dim, the brightness much less than in the real scene. Only one object is very clearly visible at the same time.

Charterhouse B.—Very dim. I can only see one part at a time.

I gather from the foregoing paragraphs that the A and B boys are alike in mental imagery, and that the adult males are not very dissimilar to them; but the latter do not seem to form so regular a series as the boys. They are avowedly not members of a true statistical group, being an aggregate of one class of persons who replied because they had remarkable powers of imagery and had much to say, of another class of persons, the scientific, who on the whole are very deficient in that gift, and of a third class who may justly be considered as fair samples of adult males.

I next proceed to colour, and annex the returns to the third of the above questions, which I have classified on the same principle as before.

Colour Representation.

HIGHEST.

Adult Males.—Perfectly distinct, bright, and natural.

Charterhouse A.—Yes, *perfectly* distinct and natural.

Charterhouse B.—The colours look more clear than they really are.

FIRST SUBOCTILE.

Adult Males.—White cloth, blue china, argand coffee pot, buff stand with sienna drawing, toast,—all clear.

Charterhouse A.—I see the colours just as if they were before me, and perfectly natural.

Charterhouse B.—The colours are especially distinct in every case.

FIRST OCTILE.
Adult Males.—All details seen perfectly.
Charterhouse A.—Quite distinct and natural.
Charterhouse B.—All colours are perfectly distinct to me in my mind's eye, in whatever scene or shape they appear to me.

FIRST QUARTILE.
Adult Males.—Colours distinct and natural till I begin to puzzle over them.
Charterhouse A.—Quite distinct and natural.
Charterhouse B.—The colours of the china, &c., are quite distinct and natural.

MIDDLEMOST.
Adult Males.—Fairly distinct, though not certain that they are accurately recalled.
Charterhouse A.—They are all distinct after a little thought, and are natural.
Charterhouse B.—Yes, quite distinct and natural.

LAST QUARTILE.
Adult Males.—Natural, but very indistinct.
Charterhouse A.—The colours of the most pronounced things on the table are distinct, as the white tablecloth and yellow mustard.
Charterhouse B.—Some are ; china, mustard, toast,—the others are not.

LAST OCTILE.
Adult Males.—Faint, can only recall colours by a special effort for each.
Charterhouse A.—Colours not very distinct.
Charterhouse B.—They are natural, but not very distinct.

LAST SUBOCTILE.
Adult Males.—(Power is nil.)
Charterhouse A.—The colours are very dim.
Charterhouse B.—The colours seem to be more like shades, but they have some colour in them.

LOWEST.
Adult Males.—(Power is nil.)
Charterhouse A.—(Power is nil.)
Charterhouse B.—(Power is nil.)

The same general remarks may be made about the distribution of the faculty of colour representation as about that of the vividness of imagery. It seems that on the whole, colour is more easily recalled than form, and especially so by the young. As the faculty of visual representation is being dropped by disuse, colour disappears earlier than form. This I may remark, was the case with the often quoted hallucinations of Nicolai, which, in his progress to recovery, faded in colour before they faded in outline.

One of my correspondents, an eminent engineer, who has a highly developed power of recalling form, but who described himself as deficient in the power of recalling colour, tells me that since receiving and answering my questions he has prac-

tised himself in visualising colours and has succeeded perfectly in doing so. It now gives him great pleasure to recall them.

It will be of interest to extract the few instances from the returns of the Adult Males in which peculiarities were noticed in connexion with colour representation, other than in its degree of vividness. Each sentence is taken from a different return.

Light colours quite distinct, darker ones less so.
Patchy.
Generally hueless, unless excited.
Mostly neutral.
Brown colour, *e.g.* of the gravy, is difficult to visualise.

Another question that I put was as follows:—

"*Extent of field of view.*—Call up the image of some panoramic view (the walls of your room might suffice); can you force yourself to see mentally a wider range of it than could be taken in by any single glance of the eyes? Can you mentally see more than three faces of a die, or more than one hemisphere of a globe at the same instant of time?"

It would have been possible to classify the Charterhouse returns, but the answers were not so generally good as to make it advisable to spend pains upon them. I therefore content myself with the replies of the Adult Males, but shall subsequently add a few facts taken from those of the boys, in a separate paragraph.

Extent of Field of Mental View.

Highest.—My mental field of vision is larger than the normal one. In the former I appear to see everything from some commanding point of view, which at once embraces every object and all sides of every object.

First Suboctile.—A wider range. A faint perception *I think* of more than three sides of a room. Rather more *I think* than one hemisphere, but am not quite sure about this.

First Octile.—Field of view corresponding to reality.

First Quartile.—Field of view corresponding to reality.

Middlemost.—Field of view corresponding to reality.

Last Quartile.—I think the field of view is distinctly smaller than the reality. The object I picture starts out distinct with a hazy outline.

Last Octile.—Much smaller than the real. I seem only to see what is straight in front as it were.

Last Suboctile. } No field of view at all.
Lowest. }

It may seem strange to some that the field of mental vision should occasionally be wider than reality, but I have sufficient

testimony to the fact from correspondents of unquestionable accuracy. Here are cases from the returns:—

I seem to see the whole room as though my eye was everywhere. I can see all around objects that I have handled.

I can see three walls of a room easily, and with an effort the fourth. I can see all the faces of a die and the whole globe, but die and globe seem transparent.

[An eminent mineralogist told me that familiarity with crystals gave him the power of mentally seeing all their facets simultaneously.]

This subject is of interest to myself on account of a weird nightmare by which I am occasionally plagued. In my dream, a small ball appears inside my eye. I speak in the singular, because the two eyes then seem fused into a single organ of vision, and I see by a kind of touch-sight all round the ball at once. Then the ball grows, and still my vision embraces the whole of it; it continues growing to an enormous size, and at the instant when the brain is ready to burst, I awake in a fright. Now, what I see in an occasional nightmare, others may be able to represent to themselves when awake and in health.

From the foregoing statistical record it will be seen that in one quarter of the cases, that is to say, in the last quartile and in all below, the field of mental view is decidedly contracted. The Charterhouse returns (A and B combined) give a higher ratio. They show that in at least 74 out of the 172 cases, or in 43 per cent. of them, it is so; indeed, the ratio may be much larger, as I hardly know what to say about 51 cases, owing to insufficient description. I am inclined to believe that habits of thought render the mental field of view more *comprehensive* in the man than in the boy, though at the same time it causes the images contained in it to become fainter.

A few of the boys' answers are much to the point. I append some of them:—

The part I look at is much smaller than reality, with a haze of black all round it. It is like a small picture.

I have to fix my eyes on one spot in my imagination, and that alone is fairly defined.

I cannot see anything unless I look specially at it, which is not the case with my real eyes.

I have to move my mental eyes a good deal about. The objects are not defined at the same time, but I think of them one at a time; also, if I am thinking of anything, as a map for instance, I can only imagine one name at a time.

The next question that I put referred to the apparent position of the image. It was as follows:—

"*Distance of images.*—Where do mental images appear to be situated? within the head, within the eye-ball, just in front of

the eyes, or at a distance corresponding to reality? Can you project an image upon a piece of paper?"

Unfortunately this question was not included among those that I first issued, and I have not a sufficient number of answers to it from adult males to justify a statistical dependence on them even on that ground alone. It is better in this case to rely on the Charterhouse boys, of whom only twelve failed to answer the question. Reducing to percentages, I find:—

POSITION OF MENTAL IMAGES.

	Per Cent.
Further than the real scene	9
Corresponding to reality	39
Just in front of the eyes	22
In eye-ball	6
In head	15
Partly at one distance, partly at another	9
	100

The more closely the image resembles in its vividness the result of actual vision the more nearly should we expect its distance to appear to coincide with that of the real object, and this as a matter of fact I find to be the case. The meaning of the word *reflection* is bending backwards, and those who reflect have the sense of a turning back from without to within the head. When a mental scene arises vividly and without any effort, the position of the vision is more frequently external, as it is in an hallucination.

I will next give the results of the latter part of the question, about the ability to project images on paper.

For the same reason as in the last case the returns from the adult males are insufficient. I have five clear cases only among them of an affirmative answer, out of which I will quote the following:—

ABILITY TO PROJECT AN IMAGE.

Holding a blank piece of paper in my hand, I can imagine on it a photograph or any object that it will hold.

The Charterhouse boys in at least 18 cases, or in ten per cent. of them, appear to have this power. The following are a few of their answers:—

I can think things to be upon a blank piece of paper.

I can place a mental image wherever I like, outside the head, either in the air or upon any substance.

After looking at a blank wall for some time, I can imagine what I am thinking of.

I can half project an image upon paper, but could not draw round it, it being too indistinct. I see the effect, but not the details of it.

I find it very hard to project an image on a piece of paper, but if I think for some time and look very hard at the paper, I sometimes can.

I can project an image on to anything, but the longer I keep it the fainter it gets, and I don't think I could keep it long enough to trace it.

I find indirectly from the answers to other questions that visual representations are by no means invariably of the same apparent size as the real objects. The change is usually on the side of reduction, not of enlargement. Among the Charterhouse boys there are thirteen of the one to two cases of the other, and I think, but I have not yet properly worked it out, that the returns from adults generally, male and female, show somewhat similar results. The following are extracts from the reports of the boys:—

Images Larger than Reality.

The place and objects in a mental picture seem to be larger altogether than the reality; thus a room seems loftier and broader, and the objects in it taller.

They look larger than the objects [? such objects as may be handled] really are, and seem much further off, . . they look about five yards off.

Images Smaller than Reality.

Very small and close.

Much smaller and very far off.

All the objects are clearly defined, but the image appears much smaller.

The difference that I see is, that everything I call up in my mind seems to be a long way off.

The difference is that it is much smaller.

Space does not admit, neither is this the most suitable opportunity of analysing more of the numerous data which I have in hand, but before concluding I would say a few words on the "Visualised Numerals" which I described first in *Nature*, Jan. 15, 1880, but very much more fully and advisedly in a memoir read before the Anthropological Institute in March, 1880, which will be published in its *Transactions* a few weeks later than the present memoir. It will contain not only my own memoir and numerous illustrations, but the remarks made on it at the meeting by gentlemen who had this curious habit of invariably associating numbers with definite forms of mental imagery. It is a habit that is quite automatic, the form is frequently very vivid and sometimes very elaborate and highly coloured, and its origin is always earlier than those who see it can recollect. Those who visualise numerals in number-forms are apt to see the letters of the alphabet, the months of the year, dates, &c., also in forms; but whereas they nearly always can suggest some clue to the origin of the latter, they never can, or

hardly ever can, to that of the numerals. I have argued in the memoir just mentioned, partly from this fact and partly because some of the number-forms twist and plunge and run out of sight in the strangest ways, unlike anything the child has ever seen, that these are his natural, self-developed lines of mnemonic thought, and are survivals of the earliest of his mental processes, and a clue to much that is individual in the constitution of his mind. I found that only about one in thirty adult males saw these forms, but suspected that they were more common in early life, and subsequently lost by disuse. This idea is abundantly confirmed by the returns of the Charterhouse boys. Nearly one in four has the habit of referring numbers to some visual mental form or other; often it is only a straight line, sometimes more elaborate. No doubt as the years go by, most of these will be wholly forgotten as useless and even cumbrous, but the rest will serve some useful turn in arithmetic and become fixed by long habit, and will gradually and insensibly develop themselves. For want of space I must here close my statement of facts; and, my data being thus imperfectly before the reader, it would be premature in me to generalise. I trust, however, that what has been adduced is enough to give a fair knowledge of the variability of the visualising faculty in the English male sex, and I hope that the examples of the use of my "Statistics by Intercomparison" will convince psychologists that the relative development of various mental qualities in different races admits of being pretty accurately defined.

FRANCIS GALTON.

II.—THE UNITY OF THE ORGANIC INDIVIDUAL.

I.

IN the free exercise of our thought and volition, we would laugh to scorn the intimation that not in our own undivided personality are lodged these sovereign powers, but that they originate outside of it, dispersedly, within the diminutive lives of a vast number of microscopical threads and dots. We would resign our autonomy to the five or six billions of corpuscles composing our bodies, upon no other conditions than such as have convinced us that, in spite of all appearances to the contrary, the earth is moving round the sun. It constitutes the loftiest pride of our culture to abnegate subjective impressions in favour of the demonstrations of science. We know, therefore, how we shall have to deport ourselves in the presence of facts, if they visibly confront and obstinately oppose our feeling

of centralised personality. The histologist spreads before us a shred of brain and a shred of muscle, and apparently there is nothing there but fibres and corpuscles. "These are the neural elements that compose your nervous system, these the contractile elements that make up your motor organs. It is they that feel and think, that move and overcome resistances. What you call the consciousness of your personality is nothing but a resultant of the activities of myriads of such separate beings, of which your so-called body is a mere aggregate." This way of looking at things, commonly adopted by men of science, cannot be ignored by philosophers, for it leads inexorably to certain definite philosophical conclusions. It admits of no compromise. If it is true, psychology will have unreservedly to bend to its bearings; and this is my plea for laying before a philosophical audience the somewhat biological contents of these pages. If sensations are in truth compounded from the data furnished by individual and elementary cells, then psychological results must inevitably be realised in a sphere transcending vitality. Our organisation will be nothing but an elaborate mechanical apparatus through which mysterious outside powers are keeping up a telegraphic communication with a realm of pure spirituality, and through which this spiritual realm reacts mechanically on the outside powers. To be logically driven to such a conclusion would be indeed a strange fate for a generation that takes both life and science seriously.

The Cell-theorists exult in the idea that so many billions of separate beings are, unconsciously and nevertheless with rigorous precision, shaping and actuating the marvellous mechanism of our complex life. They do not perceive that their fancied configuration of elementary units would necessitate a complex system of supernaturally pre-arranged harmonies, compared to which the moving and harmonising contrivances of the 'Monadology' would appear simple and natural. It is rather humiliating for biologists to find out at the end that all their strenuous efforts to bring the phenomena of life within the sphere of physical and chemical explanation have only resulted in a most emphatic and powerful confirmation of metaphysical doctrines.

How was it possible for so many vigilant inquirers to persist in overlooking the necessary philosophical implications of their fundamental doctrine? No lack of serious and well-directed philosophical thought can be imputed to the foremost representatives of natural science. On the contrary, never before have its votaries been more earnestly striving to gain an understanding, not only of detached occurrences, but also of the general interdependence of natural phenomena. But never before, also, has the task of generalising been so utterly perplexing as just

now. On the one hand, the growing consciousness of the ultimate mental consistency of all experience is rendering more and more suspicious and unsatisfactory the plain and definite tenets of the corpuscular theory of matter, tenets that have hitherto afforded so firm and safe a basis, at least for physical and chemical research. On the other hand, the extensive groundwork of verified and irrepressible facts, composing our scientific knowledge, makes it quite impracticable for impatient systematisers to palm upon us a view of things in any way incongruous with this imposing array of ascertained experience. The easy time is for ever past when natural events had merely to be explained so as approximately to fit a given system. We now find ourselves burdened with the harder task of having to construct a system that will accurately fit the natural events. There is placed before our minds a rich medley of seemingly disparate and yet somehow intimately interlacing facts ; and now we wish to know how this scientific miscellany is to be conceived as the one consistent and uncontradictory whole which it unmistakably constitutes. Strict regularity is discovered wherever exact investigation penetrates, and yet however much we may be striving to reach a comprehensive view of nature, our bewildered understanding fails in the attempt; not, indeed, as might be supposed, because of the many gaps in our knowledge, but because of the irreconcilable contrasts in it.

All our numbering, weighing, measuring, and classifying does not suffice to lay effective hold on objects. We set out with the impression of having matter before us, and end with the conviction that it is all force ; force not a twin-manifestation of materiality, keeping equal pace with it, but force encroaching on the very essence of matter, till nothing substantial is left. Force, then, under this aspect, would seem to disclose itself as the true reality, underlying material appearances. But as soon as we endeavour to seize upon it for close inspection, it evades our grasp, losing itself completely in its effects—transformed into something new and strange. It needs, indeed, only an eye keen enough to pierce beyond the veil of phenomenal repose to see it figured by the wildest imaginable phantasmagoria.

But however profound our diffidence may have become with regard to the ultimate consistency of existence, we are undoubtedly in possession of a stupendous stock of scientific truths gathered from the minute investigation of inorganic nature. Thus prepared and equipped, we approach the mystery of the organic world. We discover the very transition of the inorganic into the organic—the actual formation of organic compounds out of inorganic elements, and we trace a progressive series of synthetical products from the lowest to the highest

organic substance. We cannot doubt that organic nature is the evolutional outgrowth of inorganic nature, and that the most complex organic product has been gradually elaborated from less complex compounds. But suddenly, amid this apparently satisfactory view of things, we are reminded of Berkeley's fundamental maxim—"To be is to be perceived"; and we realise the incontrovertible truth that the organism cannot possibly be the mere product of its inorganic factors, nor these inorganic factors themselves what they seemed to be, for their very nature and existence is conditioned by the perceiving mind which looks out from the organism that just before was considered to result simply from their own material combination and dynamical co-operation.

Thus in our progress from inorganic to organic nature, the scientific puzzle becomes still more tangled and diversified. If, on the one side, the material constituting organisms and the forces actuating this material are exclusively derived from inorganic sources, then animate existence is certainly altogether dependent on inanimate existence. If, on the other side, it is the specific vital activity of animate existences which endows inanimate existences with every one of their discernible qualities—which, indeed, renders them at all sensible realities, then surely lifeless nature is altogether dependent on living nature. The dilemma is inevitable. The consciousness of it now forms part of every thoughtful mind, haunting the certitude of first principles, and threatening with dissolution the entire subsistence of material as well as ideal reality.

We have to make clear to ourselves that it is a perfectly legitimate biological inference which has increased our scientific perplexity to such an alarming and overwhelming extent. It is our growing insight into vital activity that has dissipated objective as well as subjective substantiality. Modern scepticism is the unmitigated expression of a physiological fact. It is evident beyond dispute that the influences stimulating our organs of sense cannot possibly bear the least resemblance to the perceptions which they rouse in the brain, and which manifest themselves there organically, by dint of its own inherent vital powers and in conformity with its own indwelling vital laws. It was through the direct investigation of the biological phenomena of vision that Berkeley achieved his signal and decisive victory over hypostatical materiality. And it was at bottom also a physiological conception that led Hume to question the spontaneous efficacy of mind, and with it the innate inherence and necessary coherence of its ideas.

There remained then of the whole universe—unsustained by any material, mental, or spiritual support—the bare manifestation

of a more or less coherent series of impressions, actual and remembered, only an evanescent play of loosely-bound phenomena, emerging for momentary use from vacant nothingness. Is this not truly the gist of Nominalistic Idealism, the much-vaunted philosophy of our age—life abandoned by reason, and delivered over to blind nihilism?

Our thinking has, indeed, been caught in the giddy whirl of vitality, and now finds itself everywhere and nowhere at the same moment. The superficial contemplation of living activity has led it astray. The more profound contemplation of living activity will right it again.

It would seem as if Evolution contained a promise to life of fruitful toil, secured by enduring triumph and progressive power. But Evolution is as yet only empirically known in its general effects and collective workings. It is not scientifically intelligible as a power primordially directing life. The attempts at an application of the principles of Evolution to the fundamental properties of life have hitherto failed. It will presently be shown that neither Mr. Darwin's Pangenesis, nor Mr. Herbert Spencer's Polarigenesis, nor Haeckel's Perigenesis can stand the test of accurate inspection. The cell-theory is here everywhere in the way, creating impassable chasms between organic gradations which evolutionally ought to follow each other in unbroken sequence and continuity.

However, it is in this direction, I believe, that we have to seek for a firm anchorage for our Philosophy, now adrift on a fathomless sea, and for ever severed from its traditional moorings.

II.

The great generalisation that, at the present moment, has gained unrestricted sway in biological research, may be shortly expressed in the following terms:—

The complex organism is in reality an aggregate of morphologically distinguishable units. It is in these individual units that the fundamental properties of life are inherent, and the various activities manifested by the organism, as a whole, are resultants of the discrete activities of just so many of these autonomous elements as the organism is composed of.

It is clear that the biological inquirers, who accept this cell-theory as ultimate truth, or, at least, as a final foundation for their science, do not profess to concern themselves with the real mystery of life. Nutrition, growth and reproduction, heredity and adaptation, motility and sensibility, in fact all the properties essential to living beings, are by them already presupposed as original endowments of the morphological units.

Their task can only consist in showing how the living elements become associated and grouped so as to constitute a complex organism, and how, by their definite arrangement and co-operation, complicated functions are then performed. They keep in view, as far as possible, only the cycle of individual development, the ontogenetic circle, and are striving to establish within these limits a statical science, a science of definitely pre-established cell-multiplication and cell-association.

But, we may pertinently ask, is not the very emergence and maintenance of life essentially dynamical? And is not even its visible embodiment a veritable vortex, only phenomenally stable, but in reality receiving shape and constitution from an unremitting flow of molecular change?

This fashioning of the form of life by molecular processes is obviously the one fact that, above all others, has to be investigated, if we seriously desire to become initiated into the secret of life. We cannot accept the enigma of the cell as final. We are driven by the requirements of science to seek for an explanation of the primary properties of the living substance, nutrition, growth, reproduction, and all the rest.

The embryonic cell-structure, issuing from a single parent and resulting nevertheless in the strange diversity of tissues that compose the complex organism, is in itself an irrepressible plea for a strictly evolutional interpretation. It is perfectly legitimate to desire to know how vital properties, originally condensed within the compass of a single cell, become eventually unfolded, so as to be morphologically represented by specific tissues, occupying wide-spread regions of an organised commonwealth, composed of myriads of mere derivative daughter-cells. It would, indeed, be a triumph of biological insight, highly conducive to the formation of a real science of life, if we could possibly ascertain how the molecularly correlated energies of the initial morphological unit get so widely differentiated and dissevered, in the course of cell-multiplication, as ultimately to constitute the well-nigh exclusive properties of distinct groups of cells, the so-called tissues—muscular tissue ministering essentially to motility, nervous tissue to sensibility, the tissues of the entoderm to nutrition, and so on.

But there are vital changes that urge us still more peremptorily to inquire into the conditions that underlie organic plasticity and development. The variation of individual organisms from their generic type is a phenomenon that cannot evade our daily observation. Here the deviation and adaptation of vital forms and energies become immediately perceptible, and the scientific mind is impelled to account for such changes.

It is plain that if the shapes and functions of life are, indeed,

not immutably fixed, if, moreover, such variations as occur do not entirely depend on intrinsic powers, but are, on the contrary, also conditioned by external circumstances, then surely such modifying external influences can be exerted only on the ultimate constitution of the morphological units. The specific motions that make up the life of the elements are those that must be affected by the modifying process; for the life of the entire organism is avowedly only the resultant of the lives of its elements. We find ourselves, therefore, again compelled to penetrate beyond morphological appearances into the secret nature of the cell itself. In order to explain any change that may be effected in the organism by influences emanating from the medium, we must question the molecular processes through which the change is necessarily realised.

An hypothesis having for its foundation the absolute invariability of organisms, would be too strikingly at variance with most evident facts to have a chance of being propounded by anyone. On the other hand, the variation and development of organisms solely by dint of intrinsic energies is a supposition utterly opposed to our most fundamental scientific conceptions; spontaneous change, under whatever guise, being inconceivable to our mind as now constituted.

The modification of organisms by external agents, expressing —as everyone will admit—an incontestable truth of nature, the exigencies of science make it imperative on us to inquire into the positive manner and means by which the constitution and the properties of the morphological units become altered through the action of external forces. This investigation involves necessarily an examination of all the fundamental properties of life, for we cannot proceed very far in our research without becoming aware that all vital properties are mutually interdependent, so that it would be an unprofitable effort to try to gain a separate understanding of any single one of them. We have then to set to work to find out with some degree of precision how the activities of life are connected with each other at their common source, the cellular protoplasm; and it is incumbent on biology not to disavow the task, however difficult it may seem. All complex organisms are said to be aggregates of morphological units; all phenomena of life, resultants of the peculiar energies of these units. Forces emanating from external sources induce changes in organic forms and functions. The effect of these modifying forces can be wrought only on the intimate structure and properties of the efficient elements. Biology is the science of organic forms and changes. Consequently, no essential progress can be made in that science without a more perfect insight

into the innermost nature of the units, by which all organic shaping and changing is directed and executed.

I have purposely dwelt so long on the necessity of turning our attention to the study of the molecular motions that constitute the life of the morphological units, because to many prominent investigators the undertaking appears still visionary, or, at least, premature. I hope, however, to convince all candid judges, who may find time and inclination to follow my statements, that the endeavour is by no means hopeless, but that, on the contrary, it may be pursued with signal profit and success. Instead of deriding as intruders into a field of fruitless speculation those bold scientific pioneers who first ventured to penetrate to the remote starting-point of vital changes, we may well feel deeply indebted to them for having pointed out, and made accessible to us, a mine of real and as yet unappropriated wealth.

When we examine the sundry attempts at a scientific elucidation of the fundamental properties of life, as energies inhering in the morphological units, we invariably find that this ultimate research into vital activities is guided by one predominant principle of Aggregation. Here, as everywhere, from the building up of the molecule to the building up of the cell and the building up of the entire organism, the grouping of elements and composition of elementary forces is the one answer ever offered by our science in explanation of any fragment of the great world-riddle—the creation of an infinitely diversified yet coherent and consistent universe within the unitary consciousness of the organic individual.

The problem, as hitherto conceived by the few illustrious thinkers who have grappled with it, consists in the representation in thought of an organic molecule, which is the bearer of such properties as will enable it to construct the organism by aggregation in directions resulting from its own intrinsic forces; and which will enable it also to effect all vital movements by the composition of its own energies with the energies of the other aggregated molecules. All modifications are thus directly wrought on the constitution of these ultimate vital molecules, and are then secondarily expressed and magnified in the altered construction of the entire organism, and in the modified display of its functions.

Before scrutinising the special suppositions connected with this view of organisation, I will mention that, by diligent and long-continued observation of protoplasmic units, I have been led to look for the solution of the problem in an entirely different direction.

I would oppose to the *aggregational* view of organisation a *segregational* view, holding that the morphological subdivisions

in the centralised organism are caused by the specification of a single protoplasmic individual, and not by the association of a multitude of such individuals. The current theory, according to which the complex animal organism comes into existence through the aggregation of a vast number of autonomous elements, I wish to supplant by a theory which strives to demonstrate that the complex animal organism is itself a unit, only partially specified into anatomical and histological provinces. This truth, so completely at variance with our present biological conceptions, has been irresistibly forced upon me during my protoplasmic studies, and this in spite of the utmost watchfulness against anything that might at all resemble Conceptualism or Platonic Realism.

The distinct morphological divisions of higher animals are, indeed, integrant, not constituent, parts. They are specialised and segregated from a pre-existing whole, and are in no way discrete and independent units joined together in the composition of a complex totality. Here, for once, we actually meet in nature with that peculiar order of precedence, which—introspectively projected—has inspired so many intuitional world-conceptions. The whole is here in all reality antecedent to its parts. The organism is prior to its tissues, the tissues prior to their supposed elements. The centralised organism is not, as universally assumed, a multiple of ultimate units, but is, on the contrary, itself one single individuality. It is resolvable neither into morphological nor into physiological elements, but remains from first to last one indivisible chemical integral, a monadic molecule of such stupendous vastness and complexity, yet withal so potent in the exact maintenance of its specific individuality, that our imagination faints in the effort to picture it.

Conscious of the immense amount and diversity of evidence that, during these last forty years of busiest scientific devotion, has been amassed by a host of enthusiastic workers in support of the Cell-theory; filled also with admiration and reverence towards the great masters who have formulated this luminous conception as the highest expression of our scientific insight into the solemn problem of life; it was only after many years of silent work had matured my conviction of its fallacies, and had supplied me—as I believe—with a far more adequate and profound view, that I have taken courage to lay before my fellow-workers the grounds and results of my dissent.

III.

Whence the centralised vitality and co-operative activity of the complex animal organism? How amidst the maze of myriads

of merely agglutinated morphological elements is one ever to reach the efficient focus, where molecular forces are weaving the form and functions of organised beings?

Mr. Darwin, by the perfect restraint which the consciousness of real and assumed facts imposes upon his rigorously scrupulous mind, finds himself debarred from the possibility of attempting a molecular interpretation of the phenomena of life. Since the modifications undergone by organisms take place simultaneously and diversely in a great number of morphologically and physiologically independent vital units, how does it come to pass that we find all these separate changes, at the end, united and adequately represented in the minute compass of a single cell, detached from some more or less out-of-the-way part of the vast cell-aggregate? This germinal ingathering of dispersed faculties is an organic conjuring-feat of so astounding a character, that even the renowned sagacity of our great reformer must have felt sorely taxed in the effort to discover anything like a natural and serious explanation of it. As matters actually stand, the bewildered biologist is simply compelled to imagine the sundry faculties, thus widely distributed among many discrete and disparate cells, as being severally and bodily collected from their scattered seats, and then somehow adroitly conveyed as into a single box. Whatever there may be found of mediæval grotesqueness in this more involutional than evolutional hypothesis is certainly not due to the predilections of its propounder, but solely to the exigencies of the occasion. Pangenesis is really the only hypothesis of vital phenomena compatible with the cell-theory. The propagation by inscrutable germs of the specific nature of each separate morphological unit seems—under the conditions of our present science—the only consistent way of accounting for the reproduction of old-established and newly-acquired qualities.

The task is first to explain how all the morphological units of the complex organism come to be represented in the germ-cell, and, secondly, how during the reproduction of the complex organism all its morphological units come to be evolved again in due succession and distribution. These are the questions forced upon us by the cell-theory. Pangenesis answers them in the only manner in which they can at all be answered. It assumes a mysterious power, which accomplishes the gathering and selection of the necessary gemmules, and it assumes another mysterious power, to which is entrusted the orderly combination and evolution of the gemmules. This latter power is assisted by the equally mysterious fundamental vital properties, nutrition, growth and reproduction. Pangenesis is, indeed, the *reductio ad absurdum* of the cell-theory. It offers an explanation that explains nothing to a theory that can never be explained.

But before speculating any further on the putting together of the composite organism, let us dwell for a little on the undivided nature of the morphological units, those elementary organisms in which the vital powers finally reside. Swedenborg believed the entire universe to exist in the shape of a monster-man, we lesser men representing vital units, it might be, in the big man's liver or spleen. Within the sphere of animal personality, the cell-theory is an exact reproduction of this conception; only it is supported by a great array of palpable and plausible evidence.

When, however, with unbiassed mind we contemplate the marvellous complexity of organisation reached by avowedly unicellular animals, we cannot escape the conviction that to understand the secret of their vital properties and structural differentiations, would be equivalent to the understanding of the entire secret of vitality.

Take the ciliated infusoria, for example, the Paramaecium aurelia, everywhere procurable, and you will find here hardly any organically essential part missing. You have a cortical layer, and it is from this layer that in the higher animals all sensory organs and the nervous system originates. You have a contractile layer, and it is from this layer that all ectodermic muscles are developed. You have a circumscribed and definite mass of protoplasm ministering to food-assimilation, and it is from this protoplasm that the entoderm of the so-called metazoa derives its origin. There is an oral and an aboral pole, a head and a tail, a mouth and an anus, a ventral and a dorsal aspect. There is a gullet conveying food near to the extreme end of the organism. There are depurative organs, with definite and far-reaching channels. There is also enclosed in the granular protoplasm a mysterious mass of almost hyaline substance, called the nucleus. This lively and most specifically constituted cell or animalcule darts about in all directions, sensitive to the manifold conditions of its medium. If by any means one could penetrate the vital enigma of this one living unit, one might almost rest satisfied. At all events, it would be but a secondary task to puzzle out afterwards how by a peculiar juxtaposition of myriads of units endowed with such potencies a complex organism is formed, simulating in its entirety exactly the same specific traits that are already primitively present in every one of its constituent elements.

What, then, constitutes the life of the single cell—its nutrition, growth and reproduction, its shape, heredity and adaptation, its motility and sensibility? How are these fundamental properties of animal beings connected with the material by which they are manifested.

It was Mr. Herbert Spencer, who, under the sway of the doc-

trine of Evolution, first made a serious effort to reach the ultimate seat of vitality. His circumspect and penetrating mind discerned the necessity of referring the phenomena of vital existence and development to the molecular processes occurring in the living substance. He recognised the great truth that life is essentially and primordially dynamical; that its morphological appearances result from the play of vital motions. This leading principle of biology he endeavoured to elucidate in the following manner:—We know that in a proper medium crystals will form. Some peculiar force inherent in the chemical molecules, that are the constituent units of such crystals, compels them to range themselves during solid aggregation in definite directions, and with definitely varying degrees of cohesion. The peculiar power here at work we call Polarity, merely to give it a name. Polarity then means the influence which certain molecules of the same kind exert on each other during unimpeded aggregation, so that by their conjunction a morphological unit results, specifically shaped, and having physical properties specifically varying in the sundry directions of its shape. Now it is clear, that the constituent molecules of the living substance must be immensely more complex than other molecules, much more complex even than the molecule of protein. Perhaps five or six protein-molecules, chemically linked together by phosphorus or sulphur, may represent the unit of the living substance. Units of such atomical complexity will be the bearers of highly impressible constitutions, in which changes, occurring in their environment, will become faithfully registered. Thus by exposure to different influences the molecules of the divers organisms have in the course of generical evolution become widely differentiated, each organism being now made up of units quite specific to itself, in the constitution of which units the result of the entire life-history, of the entire derivation, of the organism rests securely preserved. Concomitant with this constitutional registration of impressions there is developed the mysterious power of polarity, the same kind of power which was found to be the formative energy inherent in crystalloid molecules. The polarity of the chemical or physiological units of organisms evinces itself in the reproduction, during unimpeded aggregation of the complete adult organism. Each separate unit represents constitutionally the entire organism, and on aggregation with so many other like units as will equilibrate all their inwoven polarities, the form of the adult organism is gradually gained. The adult organism is the result and expression of the complete equilibration of the polarities inwoven during evolution into the constitution of the physiological units. It is thus that Mr. Herbert Spencer endeavours to actuate the processes ministering to organisation.

And it must be confessed that, if life is, indeed, to be shut up in a molecule, that registers evolutional changes merely by intrinsic modifications, the conception can perhaps hardly be improved upon. Grant the existence of the physiological unit, and you have to do the best you can with the given material.

But calmly viewed in the light of established scientific principles the hypothesis runs riot. It upsets everything. It refuses to bend to mechanical laws, and it contradicts evolution.

Polarity conceived as a directing force inhering in chemical molecules is not mechanically interpretable. Of course sundry attempts in that direction have been made, of which mode of explanation Redtenbacher's "System of Dynamids" may be considered typical. It is impossible to derive from atoms, conceived as points or globules, a difference of physical properties in the different directions of an aggregate of such atoms. However, it is only necessary to assume that the atoms themselves are axial beings, and that they range themselves on aggregation in directions corresponding to their axes, in order to derive whatever shape and whatever cohesive differences we need. The artifice of quietly smuggling into our premisses whatever we wish to extract from them, is here very palpable. It seems to be thought that we can reduce the strangeness of a mystery *ad libitum*, simply by decreasing the size of its material embodiment.

It is, indeed, mechanically intelligible how a globule can result on aggregation from unimpeded forces inhering in molecules, but not how the specifically deviating shape of a crystal can thrust itself into existence. Here we have, evidently, something at work counteracting the natural tendency of cohesion.

It is, however, just possible to construct a mechanical hypothesis of crystallisation, by having recourse to extrinsically directing forces. We may, for instance, imagine that thermal inequalities obtaining between the solvent and the crystallising substance, due to changes in their mutual molecular relations and to their different specific heats, may possibly give rise to a system of heat-waves forming definite stereometrical configurations, in which dynamical moulds the petrifying material gets shaped.

But allowing polarity to remain an occult property of molecules, we find that, whilst crystalloid molecules aggregate in crystals, colloid molecules, on the contrary, invariably aggregate in globules, when unconstrained. Even salts crystallising in colloidal solutions are thereby kept within globular confinement, and hyaline organic tissues, such as, for instance, crystalline lens fibres, are seen on imbibition to be converted into a number of colloidal globules. Polarity fails to build up specific colloidal

shapes of the most elementary kind; much less will it prove efficient to urge organic molecules into the divers forms of morphological units, and then, leaping the bounds of morphological individuality, still retain sufficient power further to coerce the autonomous units into the matured shape of the adult organism.

But the incompetency of Polarigenesis is by no means the greatest difficulty in the way of the hypothesis of physiological units. Physiological units have somehow to multiply, have, in fact, most prolifically to propagate, and are therefore necessarily supposed to mould foreign matter rapidly into their own specific kind. They are believed to be endowed with such gifts of fertility, as will enable them to convert outside material into a multitude of other physiological units just like themselves. Now, it is quite evident that, compared with this procreative achievement, Dr. Charlton Bastian's spontaneous generations are mere child's play; nay, even the special-creation hypothesis involves the lesser miracle. The evolutional toil of endless ages has, at last, succeeded in establishing the physiological unit of a mouse or an elephant. In its marvellously specific constitution are embodied all the divers and multitudinous characteristics of the organism to which it belongs. By dint of these laboriously inwrought faculties, it represents in itself the entire animal. To maintain its own exalted integrity against disintegrating influences requires already a stupendous exertion on its part. But more, many more, whole shoals of just such units being wanted for the construction of the vast animal aggregate, it is thought sufficient for this creative purpose to place random material in close proximity to some genealogically derived units. With implicit reliance on the efficacy of the procreative miracle, it is expected that somehow the genealogical units will prove equal to the task of converting ever so much dead pabulum into their own living likeness. It will be conceded that this generative feat would be strangely at variance with the undeniable truth that "construed in terms of evolution, every kind of being is conceived as a product of modifications wrought by insensible gradations on a pre-existing kind of being."

Of course, it will be forthwith objected, that vast amounts of foreign matter are, nevertheless, constantly and most obviously transformed into living substance. Precisely so. But, how this is effected is, as yet, a secret, though I hope it will remain a secret no longer to those who may summon up patience enough to read these few pages. However, in any case, nothing can alter the decision, that, according to the above cited formula, the physiological unit can give rise to a new being only by modifications wrought by insensible gradations upon its own self, and that

it cannot possibly convert pabulum into a dense swarm of its own kind by merely bathing in it.

It may appear rather strange that on so cardinal a point as the new production of the living unit I should have to defend the evolution-hypothesis against one of its very greatest promoters. But it serves to show how much the conception of life needs elucidation. We are all now consciously working on the plan of chemical substitution, on the evolutional plan; modifying and elaborating by degrees a common system.

Haeckel, who, ever since Darwin's awakening call, has been persistently labouring at the great task of radically evolutionising the science of life, has likewise presented us with a profound view of fundamental vital activities. The consummate biological knowledge and dauntless philosophical zeal of the illustrious investigator render this gift invaluable to all who are striving to penetrate to that remotest retreat of vitality, where with ceaseless toil molecular forces are weaving the wondrous substance of life.

According to Haeckel, the substance of a moner is as uniform as that of a crystal; for like a crystal the moner consists of an aggregate of equal molecules. Physically, chemically and physiologically every part of this homogeneous, living substance, or plasson, is endowed with all the properties of every other part, and is therefore capable of performing all the functions manifested by the entire moner. The molecule of the plasson is, like all other molecules, merely a definite combination of certain qualitative atoms. Only it is exceedingly more complex in its present highly elaborated state than the molecule of any other substance. Its properties result entirely from its chemical and physical constitution, and are in no way otherwise superadded to it. Certain atoms combined in certain ways make up certain substances, possessing certain inherent properties. This is the essence of it all, there being nothing enduring in the world save atoms. These are eternal and invariable, and are endowed with eternal and invariable energies, both physical and psychical. Concomitant with the material grouping of atoms to molecules, and of molecules to variously aggregated substances, there proceeds a combination of the energies of the respective atoms into resultant energies. The highest resultant of the kind makes itself known as the psychical energy of the higher animals. But even the least complex chemical process cannot be understood without ascribing sensation and volition to the atoms that take part in it. How could they otherwise exert their singular faculty of selective attraction? The living molecule, or plastidule, besides the properties which it has in common with other molecules, displays one energy peculiar to itself, and constituting the

essence of its vitality. It possesses, namely, memory of an unconscious kind, or the power of reproducing its own specific motion, together with such modifications as may have been wrought upon it by external influences. By dint of this faculty of intrinsic reproduction, it not only maintains its own marvellously complicated identity, but it propagates also its specific motion to the adjoining pabulum, which, thus coerced into like atomic vibrations, is thereby also transformed into plastidules of the same kind. In this manner organic propagation, a faculty believed hitherto to constitute the most inscrutable of all vital manifestations, receives a mechanical interpretation. An organism propagates its own kind merely because its ultimate molecules convert foreign material into their own likeness, by transmitting their specific motion to it. Propagation of kind is therefore, in the last instance, propagation of specific motion. With the understanding of this most fundamental vital activity, all other manifestations of life become readily intelligible. For example, we can easily conceive how growth must take place under such conditions. There is, indeed, no essential difference between the growth of a morphological unit or plastide, and the growth of a crystal. The crystal grows by apposition, or extrinsic accretion of equal molecules. The plastide grows by interposition[1] or intrinsic accretion of equal molecules. When by the addition of more and more plastidules the plastide has increased so much in bulk as to overreach the measure of its cohesive power, then division into two equal parts, or breaking up into many parts, or budding out of the plasson will occur. These well-known modes of multiplication openly displayed by the plastides are merely the visible result of the hidden propagation of plastidules.

Now it is clear, that two plastides or morphological units resulting from the division of a uniform mass of plasson, however equally endowed they may start on their separate courses, will eventually become exposed to different modifying influences. These influences will gradually change their respective plastidule-motions, thus differentiating the constitution of the two plastides. During this modifying process those plastidules which most readily adapt themselves to the changed conditions will by degrees convert all other plastidules, contained in the same morphological unit, into their own likeness, upon which the modification may be said to be thoroughly established. The plastide is then completely adapted. Now the plastide divides again, and again dissimilar influences cause further deviations from the parent-type. In this manner the differentiating opera-

[1] The word generally used in this relation is "intussusception". However, it does not accurately express the process; and, besides, I have to reserve it for a much more significant use.

tion proceeds from generation to generation, the whole series of diversified individuals representing together a many-branched genealogical tree. Each individual transmits faithfully to its offspring its own inherited motion as modified during its previous life-time. Thus by continual development from generation to generation new features are grafted on or rather are united with old traits, the last individual on the topmost twig of the evolutional tree representing the condensed result of all preceding changes.

This progressive generical differentiation is perfectly intelligible, the fundamental assumptions once granted. But now comes the difficulty. If, instead of following up the ideal ramifications in the development of separate units, derived from some primitive ancestor, with whom there has never existed any connexion in space, if, instead of contemplating such a phylogenetic tree, we fix our attention on the analogous ontogenetic tree, formed by the permanent association of a consecutive series of differentiated units, we shall find the puzzle becoming rather too much for us.

In vain have we at the start plausibly built up the vital molecule, have then derived from its multiplication the morphological unit, and then again from the multiplication of the latter an entire genealogical tree of successively differentiated individuals, and have at last constructed the complex organism by the permanent association of a complete succession of such diversified individuals; suddenly and inevitably we find ourselves here at the goal face to face again with the same old enigma of procreation. We commenced by assuming that we had conquered its secret at the very point at which it started into activity. We allowed as many plastidules as we needed to originate simply through propagation of the plastidule-motion. But now, after the propagating operation has unfolded itself to the utmost, we discover that the problem has, nevertheless, somehow evaded our penetration. Here, at the completion of the generative circuit, it confronts us again with unmitigated strangeness.

Through the propagation of plastidules the multi-cellular person was constructed. Now how is the propagation of this multi-cellular person effected? How are the diversely modified properties of its myriads of morphological units, at last, collected into a single reproductive element, the germ-cell? We have, positively, no clue as to how the plastidule of the germ-cell could have possibly registered all these miscellaneous and multitudinous impressions, so as to be fit to reproduce—by memory or anything else—the whole evolutional chain of units that makes up the complex organism.

At this stage of our inquiry we become aware of the wisdom

of Pangenesis. It is, as I have already remarked, the only consistent complement of the cell-theory. In order to conceive the complex organism as made up of individual units, we have to assume that the germ-cell is a congeries of gemmules derived from every one of those units. But why, it will be asked, a congeries of growing and multiplying gemmules, and not at once a congeries of ultimate molecules? Simply because, in order to evolve the multi-cellular organism from a single cell, we have to keep distinct all the divers potentialities, and we have also to keep intact the mystery of propagation.

It is the essence of the vital molecule, its *raison d' être* and *modus vivendi*, to convert all pabulum, all adjacent assimilable stuff, into its own likeness. If we were then to crowd the germ-cell with all kinds of plastidules derived from the divers morphological units of the organism, forthwith the assimilative and propagative energy of all the plastidules would be set going. There would ensue such a turmoil and desperate struggle for existence among the throng as would ultimately destroy the least specific difference between the units. Peace would not be restored until complete equality had been established among them all. There would result a uniform plasson filling the germ-cell, representing an entirely new being, and fit to propagate only its own kind.

But not merely in its final outcome is Haeckel's system of Perigenesis self-destructive. Its fundamental assumption includes already as many scientific antagonisms as can be brought together. We have a molecule, the movements of which are actuated by memory, and which constitutes a circumscribed order of atomic vibrations that transmits all the details of its intrinsically involved motions and outside material, without ever diminishing thereby its own inhering source of energy. This in plain language means (1) that metaphysical spontaneity actuates motion; (2) that a body knocking against another substance, or throwing its shadow on it, can thereby transform the same into its own likeness; (3) that in vital units there occurs an ever-renewed creation of the most highly specific energies out of nothing. These are rather startling propositions to enter into the groundwork of a professedly mechanical hypothesis.

All this sufficiently proves how inextricably perplexed even the foremost biological thinkers are apt to become whenever they attempt to elucidate the fundamental properties of life in keeping with the cell-theory.

The specific plastidule-movement can signify nothing but the chemical constitution of the plastidule conceived in terms of motion. How such intrinsic motions, how the specific constitu-

tion of any molecule can maintain itself amidst its colliding atoms in a multifariously resisting medium, is one of those mechanical puzzles as yet neglected by science or noticed only when materiality is altogether dissolved into modes of motions. Then we are at the end of all our scientific jugglery, and face to face with nothing but a mystic world of woven motions, gorgeously spread in phenomenal repose, and safely poised on that one mathematical point, our present consciousness.

EDMUND MONTGOMERY.

(To be continued.)

III.—ON THE FORMS OF LOGICAL PROPOSITION.

LOGICIANS have been much exercised in the attempt to determine the number and arrangement of the simple forms of proposition, and hardly any two who have reconsidered the question for themselves seem to have agreed in their decision. If we were constructing a complete theory of Logic we should have to ask what is the *true* account, by which we should understand the most fundamental account, of the nature and import of a proposition, and on this point different accounts would be in direct hostility to one another. But when we are discussing methods rather than theories, this is not necessary. The question then becomes, which is the most convenient account rather than which is the most fundamental; and convenience is dependent upon circumstances, varying according to the particular purpose we have in view. For the present purposes of inquiry, there seem to be three different accounts of the import of a proposition; the ordinary or *predication* view, the *class inclusion and exclusion* view, and that which may be called the *compartmental* view. It may fairly be maintained that one of these views must be more fundamental than the others, or possess a better psychological warrant, but it cannot be denied that they are all three tenable views; that is, that we may, if we please, interpret a proposition in accordance with any one of the three. We propose to inquire what are the prominent characteristics of each of these distinct, but not hostile, views. What are their relative advantages and disadvantages; to what arrangement and division of propositional forms do they respectively lead; and which of them must be adopted if we wish to carry out the design of securing the

widest extension possible of our logical processes by the aid of symbols?

The neglect of some such inquiry as this seems to me to have led to error and confusion. Logicians have been too much in the habit of considering that there could be only one account given of the import of propositions. Consequently, instead of discussing the number of forms of proposition demanded by one or the other view, they have attempted to decide absolutely *the* number of forms. And the very useful question as to the fittest view for this or that purpose has been lost in the too summary decision that one view was right and the others wrong.

Let us first look at the traditional four forms, *A, E, I, O;* in reference to which a very few words will here suffice. The light in which a proposition has to be consistently interpreted on this view is that of *predication.* We distinguish between subject and attribute here, and we assert that a given subject does or does not possess certain attributes. These forms appear to be naturally determined by the ordinary needs of mankind, and the ordinary pre-logical modes of expressing those needs; all that Logic has done being to make them somewhat more precise in their signification than they conventionally are. They adopt, as just remarked, the natural and simple method of asserting or denying attributes of a subject, that is, of the whole or part of a subject; whence they naturally yield four forms,—the universal and particular, affirmative and negative. For all ordinary purposes they answer admirably as they are, and by a little management they can be made to express nearly all the simple forms of assertion or denial which the human mind can well want to express.

With regard to these forms it must be very decidedly maintained that, as they generally and primarily regard the predicate in the light of an attribute and the subject in that of a class (whole or part), they do not naturally quantify this predicate: that is, they do not tell us whether any other things besides the whole or partial class in question possess the assigned attribute. No doubt they sometimes decide this point indirectly. Thus in the case of a universal negative proposition we can easily see that anything which possesses the attributes in the predicate cannot possess the attributes distinctive of the subject; that is, that the proposition can be simply converted. But this does not seem to be any part of the primary meaning of the proposition, which thinks of nothing but asserting or denying an attribute, and does not directly inquire about the extent of that attribute, or where else it is or is not to be found.

As just remarked, these forms of proposition certainly seem to represent the most primitive and natural modes in which

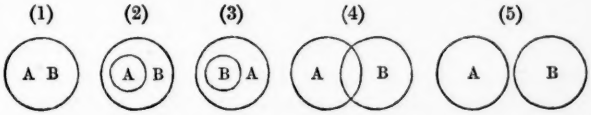
thought begins to express itself with accuracy.[1] By combining two or more of them together they can readily be made equivalent to much more complicated forms. Thus by combining 'All X is Y' with 'All Y is X' we obtain the expression 'All X is all Y,' or 'X and Y are coextensive,' and so forth. As these familiar old forms have many centuries of possession in their favour, and the various rules for conversion and opposition, and for the syllogism, have been devised for them, there seem to be very strong reasons for not disturbing them from the position they have so long occupied. At least this should only be done if it could be shown either that they are actually insufficient to express what we require to express, or that they rest upon a wrong interpretation of the import of a proposition. The former is clearly not the case, for as was just remarked (and as no one would deny), a combination of two or more of these forms will express almost anything in the way of a definite statement. And as regards the latter, the point of this essay is to show that we are not necessarily tied down to one exclusive view as to the import of a proposition. I should say, therefore, that whatever other view we may find it convenient to adopt for special purposes, either of sensible illustration or with a view to solving intricate combinations of statements, there is no valid reason for not retaining the old forms as well. They may not be the most suitable materials for very complicated reasonings, but for the expression and improvement of ordinary thought and speech they are not likely to be surpassed.

So much for this view. Now suppose that, instead of regarding the proposition as made up of a subject determined by a predicate, we regard it as assigning the relations, in the way of mutual *inclusion* and *exclusion*, of two classes to one another. It will hardly be disputed that every proposition *can* be so interpreted. Of course, as already remarked, this interpretation may not be the most fundamental in a psychological sense; but when, as here, we are concerned with logical methods merely, this does not matter. For the justification of a method it is clearly not necessary that it should spring directly from an ultimate analysis of the phenomena; it is sufficient that the analysis should be a correct one.

Now how many possible relations are there, in this respect of mutual inclusion and exclusion, of two classes to one another? Clearly only five. For the question here, as I apprehend it, is this:—Given one class as known and determined in respect of

[1] At least this seems so in all the languages with which we need consider ourselves concerned. What might be the most natural arrangement of the forms of propositions in non-inflectional languages I must leave to philologists to determine.

its extent, in how many various relations can another class, also known and similarly determined, stand towards the first? Only in the following: It can coincide with the former, can include it, be included by it, partially include and partially exclude it, or entirely exclude it. In every recognised sense of the term these are distinct relations, and they seem to be the only such distinct relations which can possibly exist. These five possible arrangements would be represented diagrammatically as follows:—



Before comparing in detail the verbal statement of these five forms with that of the four old ones, it must be pointed out how entirely the distinction between subject and predicate is robbed of its significance on such a scheme as this. The terms of the proposition being thus classes of things of known extent, this distinction sinks down into one which is purely grammatical. It is the merest accident which of the two classes is represented first in our verbal statement; whether, for instance, in (2) we say that B lies outside A, or that A lies inside B. Certainly when the diagrammatic representation alone was shown to us, no one could give a guess as to which circle was intended to stand for a subject and which for a predicate. He could not, that is, read the diagram off in one way and one way only, with confidence.

A very little consideration will serve to convince us that this scheme of five forms, and the old one of four, will not by any means fit in with one another. Considering that they spring from different interpretations of the import of a proposition, it could not be expected that they should do so. (5) is the one unambiguous exception, corresponding precisely to the universal negative 'No A is B'. That is—given 'No A is B' we could only select this diagram; and conversely, given this diagram we could only utter it as 'No A is B'. But such correspondence does not exist in any other case. Given 'All A is B' we could not but hesitate between diagrams (1) and (2); and if diagram (4) were shown we should not know whether to describe it as 'Some A is B' or 'Some A is not B,' for it would fit either equally well.

Is there then no precise and unambiguous way of describing these five forms in ordinary speech? There is such a way, and to carry it out demands almost no violence to the established usage

of language. It is merely necessary to say definitely that the word *some* shall signify 'some, not all'; a signification which on the whole seems more in accordance with popular usage than to say with most logicians that it signifies 'some, it may be all'. If we adopt this definition of the word our five diagrams will be completely, accurately and unambiguously expressed by the five following verbal statements:—

All A is all B.
All A is some B.
Some A is all B.
Some A is some B.
No A is any B.

That is—given one of these statements, only one diagram could be selected for it; and conversely, given any one diagram it could only be matched with one of these forms of words.

The tabular expression of these five forms will naturally recall to the reader's mind the well-known eight forms adopted by Hamilton, *viz.*:—

All A is all B.	No A is any B.
All A is some B.	No A is some B.
Some A is all B.	Some A is not any B.
Some A is some B.	Some A is not some B.

I might have termed the view as to the import of propositions now under discussion the Hamiltonian, instead of the *class inclusion and exclusion* view. It seemed better, however, at the outset to state the view independently in what seemed its most fundamental and characteristic form. Moreover, one is not so necessarily introduced into a well known and rather bitter controversy. At the same time I must state my own very decided opinion that the view in question is that which Hamilton, and those who have more or less implicitly followed him in his tabular scheme of propositions, are bound in consistency to adopt.

The logicians in question do not seem to me, indeed, to have at all adequately realised the importance of the innovation which they were thus engaged in introducing; nor, it must be added, the inadequacy of the means they were adopting for carrying it out. What they were really at work upon was not merely the rearrangement, or further subdivision, of old forms of proposition, but the introduction of another way of looking at and interpreting the function of propositions. The moment we insist upon 'quantifying' our predicate we have to interpret our propositions in respect of their extension; that is, to regard them as expressing something about the actual mutual relations of two classes of things to each other. The view of the proposition

must be shifted from that of stating the relation of subject and predicate, or of object and attribute, to that of stating the relation of inclusion and exclusion of two classes to one another.

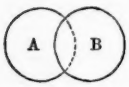
The question therefore at once arises, How do the eight verbal forms just quoted stand in relation to the five which we have seen to be, in their own way, exhaustive? As this is a very important inquiry towards a right understanding of the nature and functions of propositions, I shall make no apology for going somewhat into details respecting it. As regards the first five out of the eight, the correspondence is of course absolutely complete, if we understand that Hamilton's 'some' is to be understood, with ours, as distinctly excluding 'all'. But then, if so, what account is to be given of the remaining three out of the eight? But one account, I think, can be given. They are superfluous, or ambiguous equivalents for one or more of the first five. This may need a moment's explanation. By calling the first five complete and unambiguous we mean, as already remarked, that if one of these propositions was uttered, but one form of diagram could be selected in correspondence; and conversely, if a diagram were pointed out it could only be referred to one form of verbal expression. But if we were given one of the latter three to exhibit in a diagram we could not with certainty do so. Take, for instance, the proposition 'No A is some B'. If we had to exhibit this in a diagram we should find that diagrams (2) and (4) are equally appropriate for the purpose; whence this proposition is seen to be ambiguous and superfluous. Similarly, the proposition 'Some A is not any B,' is equally fitly exhibited in diagrams (3) and (4), and therefore appropriately in neither. Consequently it also must be regarded as needless in our scheme. The case of the remaining proposition, 'Some A is not some B,' is still worse. It is equally applicable to four of our five distinct possible cases, and therefore, as making no distinction whatever between one such proposition and another, this form is altogether useless to express the mutual relations of classes.

The ambiguity affecting these three last forms is, it need hardly be remarked, reciprocal. That is, so long as these three are retained in the scheme, we should not know, on a diagram being presented to us, which proposition was meant to be exhibited; any more than we can draw the diagram when a proposition is stated. Diagram (3), for instance, might under these circumstances be read off indifferently as 'Some A is all B,' 'Some A is not any B,' or 'Some A is not some B'.

It may perhaps be replied that there is still a use in retaining forms of proposition which thus refer ambiguously to two or more actual class relations, in addition to those forms that refer unambiguously to one only. It may be urged that if we do not

know which of the two is really applicable, though one or the other must certainly be so, there is an opening for a form which covers both of them. I do not think that this will do. In the first place it may be objected that the employment of terms in their extensive signification implies that we are expressing their actual relation to one another in the way of inclusion and exclusion, and not our imperfect knowledge of that relation. At any rate this seems to be so when we make use of diagrams of this kind, for the circles must either cut one another or not do so; we cannot express a *doubt* whether they do or not. We may feel a doubt whether they should do so or not, but we must make them do one or the other.

An attempt is sometimes made in this way by the device of marking a part of one of the circles with a dotted line only. Thus 'Some A is not B' would be exhibited as follows:—



(as, for instance, is done, amongst others, by Thomson in his *Laws of Thought*). The dotted part here represents of course our ignorance or uncertainty as to whether the line should lie partly inside B, or should entirely include it. But surely, if we are thus ignorant, we have no business to prejudge the question by putting it inside, even as a row of dots. What we ought to do is to draw *two* lines, one intersecting B and the other including it. Doing this, there is no need to dot them; it is simpler to draw at once, in the ordinary way, the two figures (3) and (4) above, and to say frankly that the common 'Some A is not B' cannot distinguish between them. In other words this form cannot be adequately represented by one of these diagrams: it belongs to another propositional theory.

But there is a more conclusive objection than this last. If we were lenient enough to admit the three latter Hamiltonian forms on such a plea as the one in question, we should be bound in consistency to let in a good many more upon exactly the same grounds. Take, for instance, the first two, 'All A is all B,' 'All A is some B'. We often do practically want some common form of expression which shall cover them both, and this was excellently provided by the old *A* proposition 'All A is B,' which just left it uncertain whether the A was all B, or some B only. Perhaps this is indeed the very commonest of all the forms of assertion in ordinary use. Hence if once we come to expressing uncertainties or ambiguities we should have to insist upon retaining this old *A*, not as a substitute for one of the two first Hamiltonian forms, but in addition to them both. Similarly we should require a form to cover the first and the third. Or again, whilst we are about it, we might desire a form to cover all the first four; for we might merely know (as indeed is often the

case) that A and B had some part, we did not know how much, in common. What we should want, in fact, would be a simple equivalent for 'Some or all A is some or all B'; or, otherwise expressed, a form for merely denying the truth of 'No A is B'.

The Hamiltonian scheme has, no doubt, a specious look of completeness and symmetry about it. Affirmative and denial, of some and of all, of the subject and predicate, gives clearly $2\times2\times2=8$ forms. But on subjecting them to criticism, by inquiring what they really say, we see that this completeness is illusory. Regard them as expressing the relations of class inclusion and exclusion (and this I strongly hold to be the right way of regarding them) and we only need, or can find place for, *five*. Regard them as expressing to some extent our uncertainty about these class relations, and we want more than eight. This exact group of eight seems merely the outcome of an exaggerated love of verbal symmetry.

If indeed our choice lay simply between the old group and the Hamiltonian, the old one seems to me the soundest and most useful. One or more of those four will express almost all that we can want to express for purely logical purposes, and as they have their root in the common needs and expressions of mankind, they have a knack of signifying just what we want to signify and nothing more. For instance, as just remarked, we may want to say that 'All A are B,' when we do not know whether or not the two terms are coextensive in their application. The old form just hit this off. An obvious imperfection in Hamilton's scheme is that with all his eight forms he cannot express this very common and very simple form of doubtful apprehension, by means of a single proposition. He can express the less common state of doubt between the two 'All A is some B,' and 'Some A is some B,' by one of what I have termed his superfluous forms, *viz.*, by his 'Some B is not any A,' for it exactly covers them both.[1]

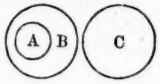
So long as we adhere to the five propositions which correspond to the five distinct diagrams, we are on clear ground. These rest on a tenable theory as to the import of propositions, sufficient to give them cohesion and make a scheme of them. That theory is of course that they are meant to express all the really distinct relations of actual class inclusion and exclusion of two logical terms, and none but these.

The advantages of this form of propositional statement, if few, are at any rate palpable and unmistakable. Each form has a corresponding diagram which illustrates its exact signification with the demonstrative power of an actual experiment. If any

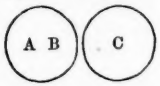
[1] Provided of course we define 'some' = 'some, not all'. This I understand Hamilton to do; but his opinion does not seem absolutely fixed here.

sluggish imagination did not at once realise that from 'All A is some B,' 'No B is any C,' we could infer that 'No A is any C,' he has only to trace the circles, and he sees it as clearly as any one sees the results of a physical experiment. And most imaginations, if the truth were told, are sluggish enough to avail themselves now and then of such a help with advantage.

But whilst this is said it ought clearly to be stated under what restrictions such an appeal may fairly be made. The common practice, adopted in so many manuals, of appealing to these diagrams—Eulerian diagrams as they are often called—seems to me very questionable. Indeed when it is done, as it generally is, without a word of caution as to the important distinction between the implied theories about the import of propositions, it seems to me that there can be no question as to its being wrong. The old four propositions *A, E, I, O*, do *not* correspond to the five diagrams, and consequently none of the figures in the syllogism can be properly represented thus.[1] We may sometimes see *Celarent* represented in the annexed form.



But this is too narrow. The affirmative represented here is not 'All A is B,' but 'All A is *some* B'. To represent *Celarent* adequately in this way we should have to append also the diagram, representing 'All A is all B,' 'No B is C,' and to say frankly that we can only know that one of these diagrams will represent our syllogism; we do not know which.[2] (The necessity of such an appeal to *alternative* diagrams is, I see, admitted by Ueberweg.)



Of course this inability to represent each syllogistic figure by one appropriate diagram will not always affect their cogency as illustrations. Any one can see in the above instance that one diagram will practically take the place of the other; and so it would in *Barbara*, but not in every instance, as we might easily show in detail. But none the less must we remember that the systems of propositions are really based on distinct theories, and we have consequently no right thus without warning to use the diagrams of one system to represent the propositions and syllogisms of another.

[1] The *rejected* figure 'No B is C,' 'No A is B,' with the consequent inability to draw any conclusion at all, *can* be thus exhibited; because the universal negative is the only form common to the two schemes.

[2] If it be urged that the upper diagram is the general one, including the lower as a special case, the answer is twofold. First, that this would be tantamount to a rejection of our scheme of five distinct propositions; and secondly, that even so we should not meet the case of syllogisms involving particular propositions, as the reader will see if he tries thus to exhibit, say, *Disamis*.

So much then for this second scheme of propositional import and arrangement. In spite of its merit of transparent clearness of illustration of a certain number of forms, it is far from answering our purpose as the basis of an extension of Logic. It soon becomes cumbrous and unsymmetrical, and has no flexibility or generality about it. Fortunately there is another mode of viewing the proposition, far more powerful in its applications than either of those hitherto mentioned. It is the basis of the system introduced by Boole, and could never have been realised by any one who had not a thorough grasp of those mathematical conceptions which Hamilton unfortunately both lacked and despised. The fact seems to be that when we quit the traditional arrangement and enumeration of propositions we must call for a far more thorough revision than that exhibited on the system just discussed. Any system which merely exhibits the mutual relations of two classes to one another is not extensive enough. We must provide a place and a notation for the various combinations which arise from considering three, four, or more classes; in fact we must be prepared for a complete generalisation. When we do this we shall soon see that the whole way of looking at the question which rests upon the mutual relation of classes, as regards exclusion and inclusion, will not suffice. There is a fatal cumbrousness and want of symmetry about it which renders it quite inappropriate for any but the simplest cases.

This third view of the interpretation of propositions which has to be substituted for both the preceding, for the purpose of an extended Symbolic Logic, is perhaps best described as indicating the *occupation or non-occupation of compartments.* What we here have to do is to conceive, and invent a notation for, all the possible combinations which any number of class terms can yield; and then find some mode of symbolic expression which shall indicate which of these various compartments are empty or occupied, by the implications involved in the given propositions. This is not so difficult as it might sound, since the resources of mathematical notation are quite competent to provide a simple and effective symbolic language for the purpose. Without entering fully into this scheme, enough may be said to bring out clearly its bearing on the particular subject which now occupies us, *viz.*, the number of distinct forms of proposition which ought to be recognised. The view which is here taken is still distinctly a *class,* rather than a predication, view; but instead of regarding the mutual relation of two or more classes in the way of inclusion and exclusion, it substitutes a complete classification of all the subdivisions which can be yielded by putting any number of classes together, and indicates whether any one or more of these classes is occupied; that is, whether

things exist which possess the particular combination of attributes in question.

A fair idea of the meaning, scope, and power of this system will be gained if we begin with two class terms X and Y, and consider the simple cases yielded by their combination. It is clear that we are thus furnished with four possible cases, or *compartments*, as we shall often find it convenient to designate them; for everything which exists must certainly possess both the attributes marked by X and Y, or neither of them, or one and not the other. This is the range of possibilities, from which that of actualities may fall short; and the difference between these two is just what it is the function of the proposition to describe. It will be best to discuss here only intimations that such and such compartments are *empty*, since this happens to be the simplest case. Now how many distinct cases does this system naturally afford? We must approach it, let us remember, without any prepossessions derived from the customary divisions and arrangements.

We should naturally be led, I think, to distinguish fourteen different cases on such a system as this, which would fall into four groups. For there may be one compartment unoccupied, which yields four cases; or two unoccupied, which yields six cases; or three unoccupied, which yields again four cases; or none unoccupied, which yields but one case. *All* cannot be unoccupied, of course, for we cannot deny both the existence and the non-existence of a thing; or, to express it more appropriately on this scheme, given that a thing exists it must be put somewhere or other in our all-extensive scheme of possibilities.

I will only call attention here to the nature of the four simplest out of these 14 cases. Writing, for simplicity, $\bar{x}$ for not-x, and $\bar{y}$ for not-y, these four would be thus represented:—

$xy=0$ or No x is y.
$\bar{x}y=0$ or All y is x.
$x\bar{y}=0$ or All x is y.
$\bar{x}\bar{y}=0$ or Everything is either x or y.

On this plan of notation, of course, xy stands for the compartment, or class, of things which are both x and y; and the expression $xy=0$ states the fact that that compartment is unoccupied; that there is no such class of things. And similarly with the other sets of symbols.

A moment's glance will convince the reader how entirely distinct the group of elementary propositions thus obtained is from that yielded by either of the other two schemes; though, starting from its own grounds, it is just as simple and natural as either of them. Of the four simplest forms contained in it,

as indicated above, one is of course the Universal Negative, which presents itself as fundamental on all the three schemes. Two others are Universal Affirmatives, but with the subject and predicate converted. But the fourth is significant, as reminding us how completely relative is the comparative simplicity of a propositional form. On the present scheme this is just as simple as any of the others; but in the traditional arrangement it would probably get in only as a disjunctive, since that arrangement dislikes the double negation 'No not-x is not-y'. Indeed on hardly any view could such a verbal statement as this last be considered as elementary, since almost every one would have to put it into other words before clearly understanding its import on a first acquaintance.

We might easily go through the ten remaining cases referred to above, but to do so would be unsuitable to a general essay like this. It may just be noticed, however, in passing, that the emptying out (as we may term it) of two compartments does not necessarily give a proposition demanding more of the common verbal statement, than that of one only does. For instance the combination, $x\bar{y}=0$, $\bar{x}y=0$, expresses the coincidence of the two classes x and y; it is 'All x is all y'. That of xy and $\bar{x}\bar{y}$ yields the statement that x and y are the contradictory opposites of one another; that x and not-y are the same thing, and consequently y and not-x.

The real merits of this way of regarding and expressing the logical propositions are not very obvious when only two terms are introduced, but it will readily be seen that some such method is indispensable if many terms are to be taken into account. Let us introduce three terms, x, y, and z; and suppose we want to express the fact that there is nothing in existence which combines the properties of all these three terms, that is, that there is no such thing as xyz. If we had to put this into the old forms we should find ourselves confronted with six alternative statements, all of them tainted with the flaw of unsymmetry, *viz.*, 'No x is yz,' 'No y is xz,' 'No z is xy,' as well as the three converse forms of these. No reason can be shown for selecting one rather than another of these; and if we attempted to work with the symmetrical form 'There is no xyz,' we should find that we had no rules at hand to connect it with propositions which had only x, y, or z for subject or predicate.

If we tried the second propositional theory we should only reduce the above six unsymmetrical alternatives to three; three being got rid of by our refusing to recognise that conversion makes any difference in the proposition. But the same inherent vice of unsymmetry in a choice of alternatives would still confront us. No reason could be given why we should rather say

that the class x excludes the class yz, rather than that the class y excludes that of xz, or z that of xy. Common language may be perfectly right in tolerating such ambiguities; but a sound symbolic method ought to be naturally cast in a symmetrical form if it is not to break down under the strain imposed by having to work with three or more terms. This requires us to avoid such forms as 'The class x excludes that of yz,' and all the analogous statements of the common Logic, and to put what we have to express into the symbolic shape $xyz=0$. The verbal equivalents for this are, of course, that there is no such thing as xyz, or that the compartment which we denote by xyz is empty. There are theoretical reasons for regarding the latter form as the most rigidly accurate and consistent.

It deserves notice that ordinary language does occasionally recognise the advisability of using symmetrical expressions of this kind, though the common Logic shows no fondness for them. We should as naturally say, for example, that 'Cheapness, beauty, and durability never go together,' or that 'Nothing is at once cheap, beautiful, and durable,' as we should use one of the forms which divide these three terms between the subject and the predicate. But this latter plan is what would be adopted presumably by the strict logician, by his arranging it in some such form as 'No cheap things are beautiful and durable'. It need not be remarked that popular language, though occasionally making use of such symmetrical forms, has never hit upon any general scheme for their expression, and would be sadly at a loss to work upon more complicated materials. Especially would this be the case where negative predicates or attributes had to be taken into account as well as positive. However, what we are here concerned with is the insufficiency of the ordinary logical view rather than the occasional ingenuity of popular expression.

In these remarks it has been attempted to keep closely to the inquiry suggested at the outset—that, namely, of the number of fundamentally distinct logical forms, and the foundation on which each different arrangement must be understood to rest. It seems quite clear that no attempt can be made to answer this question until we have decided, in a preliminary way, what view we propose to take of the proposition and its nature. There is no occasion whatever to tie ourselves down to one view only, as if the import of propositions was fixed and invariable. Very likely other views might be introduced in addition to the three which have been thus examined, though these appear to me to be the only ones with which the student is likely to have to make much acquaintance.

Each of these three stands upon its own basis, yields its appropriate number of fundamentally distinct propositions, and

possesses its own merits and defects. The old view has plenty to say for itself, and for ordinary educational purposes will probably never be superseded. It is very simple, it is in close relation with popular language, and it possesses a fine heritage of accurate technical terms and rules of application. Its defects seem to me to be principally these: that it does not yield itself readily to any accurately correspondent diagrammatic system of illustration; and that its want of symmetry forbids its successful extension and generalisation.

The great merit of the second plan—that of class inclusion and exclusion—is its transparent clearness of illustration. We may be said thus to *intuite* the proposition. This has indeed caused a most unwarranted amount of employment of its diagrams by those who do not realise that its five distinct forms of proposition cannot be properly fitted in with the four of the traditional scheme. This clearness is, however, almost its only merit. It possesses little more of symmetry or consequent adaptability of generalisation than the former, and it is considerably removed from popular forms of expression. Above all, as it insists upon exhibiting the *actual* relations of the two classes to one another, it has no power to express that degree of ignorance about these relations which many propositions are bound to do, if they are to state all that we know, and nothing but what we know, about the relation of the subject and predicate to one another. (Hamilton's eight propositions, as already remarked, seem an inconsistent and partial attempt to remedy this latter defect.)

The third scheme is, of course, in comparison with the others, an artificial one, and possesses the merits and defects which might be expected in consequence. It is couched in too technical form, and is too far removed from the language of common life, for it ever to become a serious rival of the traditional scheme on the ground appropriate to the latter. For symmetry, however, and the power which comes of symmetry, nothing can well be put into competition with it.

JOHN VENN.

NOTE.—Though the majority of logicians seem to be satisfied with the Eulerian mode of representing the ordinary logical propositions, there have always, I find, been some who have felt its insufficiency for the purpose. Ueberweg, for instance, offers an *alternative* of diagrams in some cases. But of all the writers whom I have been able to consult since this paper was in type, the two who lay most stress upon the point are Gergonne and F. A. Lange. The former of these (*Annales des Mathématiques*, vii., 189) has made a careful comparison between the five diagrammatical forms and the four propositional ones, showing in each case how many of the one set are included in any single form of the other. Lange (*Logische Studien*) has spoken even more strongly than I have here, though from a somewhat different point of view, on the radically distinct theories of the import of propositions involved in these two ways of stating or representing them. He has also worked out, as I had done, the number of distinct forms corresponding to the syllogistic figures which are demanded on the Eulerian scheme.

IV.—PERFECTION AS AN ETHICAL END.

THE existence in human nature of a moral impulse or desire of right is the ultimate fact on which the science of Ethics depends for all its value.

The origin of this desire, which is to be found in different individuals in very different degrees of strength, has been accounted for in a variety of ways, but its claim to rank among the immediate springs of action has seldom been seriously disputed. It constitutes the motive power to which Ethics undertakes to act as guide, and ethical inquiries would lose at once all their practical interest if doubts were entertained as to its existence. The different views which have been taken of the *end* to which this desire should be directed have given rise to several distinct and separate "Methods of Ethics"—to use the phrase which Mr. Sidgwick has rendered familiar. One of these methods takes happiness—either individual or general—as its end (or that alone which is absolutely good), and pronounces everything else to be good only in the degree in which it tends to produce this happiness. There are certain rules of conduct on another view, the moral value of which can be intuitively judged of, and conformity to these rules is proclaimed to be the final test and standard of conduct.

By others, again, it is maintained that the end to be aimed at is a right balance of the inward dispositions and motives. Perfection, it is thought, will be reached when the appetites, affections, and desires shall have been brought by cultivation and repression to a certain desired degree of strength; though what this precisely is we are seldom clearly told.

Now, widely as these methods are seen to differ from each other, and various as are the ideals of life which underlie them, they have all this point in common, that they regard the "moral motive," or desire of right, as a *means* only to something other than itself.

It is a motive, they one and all assume, which will have fulfilled its purpose and ceased to exist whenever a certain definite state of things shall have been reached, whether this state of things be taken to be universal happiness, or conformity to certain absolute rules, or the establishment of a certain inward balance of motives.

Its value in the eyes of most moralists is therefore *relative*, not *absolute*, and differs in degree only and not in kind from that which is ascribed to systems of government and other human institutions. It is now pretty generally acknowledged that there is no such thing as an absolutely good form of government,

though there are still some persons who cling to the belief that the precise constitution needed for a particular country is a thing that can be determined on *à priori* principles.

The old notions of "absolute rights," and "the best form of government," which once had so much influence, are now rapidly dying out, and are giving place to the more rational view that the value of every human institution must vary with the state of society, and must in all cases be dependent on conditions of time and place.

Now the relative and temporary value which is thus ascribed to government is all that moralists are commonly willing to allow to the moral motive or desire of right.

Some ideal of life is framed, and they value this motive as a means of giving reality to it. They look forward in imagination to a time when men shall have outlived the need for any such controlling influence; when natural impulses, desires, and affections shall have attained their due and proportionate development, or when the "greatest happiness of the greatest number" shall have become an accomplished fact, instead of being as at present an unmeaning and deceitful phrase.

Now it seems to me that we should be taking a truer view of the relations of ethical phenomena and providing a more satisfactory basis for a system of Ethics if we were to reverse completely the order that is here maintained, and to take the desire of right or love of duty as the *end*, towards which all other motives, together with all acts bodily or mental, all institutions, and, finally, all life itself, are to stand in the position of *means*. I regard the desire of right as the only thing having absolute worth in the universe, and I believe that the moral value of everything else can be measured by the degree in which it tends to strengthen or impair this desire; my ideal of perfection being a state of things where it shall have vanquished and destroyed every meaner impulse of man's nature, and constituted itself the sole impelling force to which he yields obedience.

In order to make any practical use of such an ideal as this, and to justify our taking it as our ethical end, we must be able to show that it is one which is fitted to supply a guide and test of men's actions in their present state of imperfection. We must be able to show that all those acts and motives which we are accustomed to approve or condemn with reference to other ethical ends, have a definite value in relation to this end also. We must show, in short, that tendency to perfection is a test which is capable of being as universally applied as tendency to happiness, or any other standard by which the moral worth of actions and motives has commonly been tried. This is a point which has not unfrequently been neglected by those who have

before now insisted on the superiority of the moral impulse to all the other springs of action, and on its claim to supersede them in virtue of this superiority.

After stating their ideal of perfection, they have commonly made no attempt to suggest any means of attaining it, and have even at times made use of language which could imply that, in their opinion, no such means are needed. They have preached the necessity of acting solely out of regard for duty, and of yielding obedience to no inferior motive, as though this were advice that men had the power to realise in their present weakness and imperfection. To call in the aid of an inferior motive from sense of weakness or fear of falling, has been spoken of as making a compromise or "parleying" with sin,[1] and condemned as a mean evasion of the duties implied in the possession of a moral nature. Now, sentiments of this kind may possibly look well in a sermon or a poem, but they are very far removed from the region of practical life, and can obviously afford no satisfactory guide to conduct. The men who deliver them are for the most part wholly unable to act up to their spirit, and have probably never seriously considered what their advice, if put in practice, would amount to. It is easy to talk of "crucifying" the flesh and the affections, and of acting only from the pure law within, but, until we hear of a man whose whole life, from the time that his moral faculty first made itself felt, was passed in obedience to its promptings, we shall refuse to believe that advice of this kind can lead to any practical result, or do anything in fact but repel men by its extravagance. In the great majority of cases it would be simple mockery to tell a man groaning under the weight of evil habits to abandon his sin at once and act henceforth as his sense of duty shall dictate. Habits are not things that can be lightly and easily shaken off, and in ninety-nine cases out of a hundred a man's love of right and duty has no power to effect a sudden change like this, and to raise itself at once to the supreme control of life.

Dismissing, then, the idea that moral perfection is a thing which lies within the reach of mankind at the present stage of their history, and allowing that if it ever come at all, it must come as the slow result of a long process of development, we must set ourselves to examine into the general character of this process, and to test the worth of the things to which moral value is commonly thought to belong, by their tendency and power to aid it.

The change we are imagining, it may be well to repeat, is one from a state of things where men act partly out of regard for

[1] Abercrombie's *Culture and Discipline of the Mind.*

duty, and partly—and far more largely—from other motives, to a state of things where love of duty shall remain the sole impelling motive; and what we have got to do is to find out how this change can be most easily and swiftly brought about, and what are the different agencies that can be made to assist in the work.

In searching for an answer to this question it is natural in the first place to ask whether any means are known to exist by which the impulsive power of one motive can be taken from it and made over to another. Is there any process in the moral world answering to what is known in the physical world as the "transmutation" or "conversion of energy"? If it can be shown that what may be termed "moral energy" or motive power can be made to assume different forms in the same way that mechanical force can be converted into heat, and heat again into electricity, we shall be able to see at once what the general character of moral progress will be likely to be. We can see that it may be possible for love of right or duty, which at present is but one of many forms of impulse, to take to itself gradually the strength of all the rest, and raise itself in time to the position of sole ruler of life. We can see too that the amount of transmutation already effected may not unfairly be taken as the measure and standard of moral development. The practical question therefore is whether as a matter of fact any such means exist by which one motive can be deprived of its power, and another proportionately strengthened.

Now, I venture to think that we have all that is wanted to enable us to answer this question in the affirmative in the common tendency of *acts* of all kinds to strengthen the motives which give rise to them.

It has frequently been pointed out that motives gain in strength in exact proportion to the amount of action they occasion, and as action implies that one motive (or set of motives) has been successful in resisting another (or others), and, as defeat leads to loss of strength, on the same principle that success leads to increase of it,—the change in the balance of motives which accompanies action may not inaptly be compared with that which takes place when physical energy is destroyed in one of its forms and made to reappear in another.

When acts of kindness, for example, have been prompted by natural affection or benevolence, the power of these motives will invariably be found to have increased, and the selfish impulses which opposed them to have undergone a proportionate degree of weakening. When a fit occasion again presents itself for the exercise of benevolence, there will be found to be less difficulty in resisting the opposing forces and acting as the charitable im-

pulses may dictate. It is well known, again, that the impelling power of the appetites and passions is increased by every fresh act of indulgence, and that, if not checked in time by the opposition of other motives, there is danger of their becoming too strong for these latter, and mounting by their depression to the supreme control of life.

In the same way, the development of the moral impulse or love of duty can only take place at the expense of the other and inferior springs of action. Coming into existence at a later stage than the impulses and desires which have regard to self, it must win its way to power by gradually resisting and overcoming them; gathering strength by each successive conquest, just as certain cannibals are said to imagine that the strength of a conquered and digested foe becomes the possession of his conqueror.

In the state of things which we have taken as our ideal of perfection, the moral motive will have concluded its victorious career by subduing and depriving of their power those desires and motives even which in our present state of imperfection we rightly regard with reverence. The affections which sweeten life will then have ceased to rule it, and pleasure and happiness will be content to follow in the footsteps of duty, and claim no more to act as independent guides. Instead of being motives to action, they will remain only as its incidents and accompaniments, and will no longer exert the disturbing influence which at present draws so many from the path of duty.

Thus we see that our ideal perfection implies the final destruction by the love of duty of *all* the other motives by which mankind are at present swayed, and it may possibly seem to follow from this that there can be no real difference between these latter in point of moral value. This, however, is by no means the case, and if the theory I am advocating were to involve any such consequence it would rightly be put aside at once as carrying an absurdity upon the face of it.

I acknowledge that there is the utmost possible difference in moral value between the various motives by which men's conduct is governed, but, at the same time, I maintain that this value is *relative* and *temporary* only, and that *absolute* worth belongs to the pure love of right alone which in the end is intended to destroy them.

I will now proceed to state what appears to me to be the real ground of the difference which undoubtedly exists between the different springs of action in respect of their moral quality, and to explain shortly the nature of the service which in different degrees they have all the power to render. The love of duty, as I remarked before, is a motive which comes into operation at a

comparatively late period of life. It has no influence over the first years of infancy, and therefore by the time it begins to make itself felt many other motives will naturally have attained to a considerable degree of strength. They will have been enjoying a period of unrestricted liberty, in which they have been suffered to grow up and gather strength unchecked—so far at least as moral control is concerned. Accordingly, as the progress and development of the moral motive is no assured thing which has been fated and decreed beforehand, but is subject to the same laws which regulate the growth and decay of all other motives, there is grave reason to fear that, in its first attempts to overcome other impulses and assume the control of action, the love of duty may meet with a decided check, and that repeated failure and consequent loss of strength may lead in time to its final annihilation—the state of things which existed in early infancy being thus brought back again in all but its former innocence.

It is here, then, that the moral value of other motives comes first into view. The love of duty, whenever it finds that the task it has set itself is beyond its present strength, and that there is danger of it being borne down by the might of an opposing impulse (as, for example, an appetite which long indulgence has made strong), can spend part of its strength in summoning to its aid another motive whose tendency is opposed to that of the too powerful appetite.

It can do, in fact, a precisely similar thing to what is done when the assistance of natural forces (as those of wind or steam) is called in to aid in resisting other forces of nature by which men's existence is threatened.

Thus, a sense of self-respect, a regard for general opinion, or a thought of the distress which indulgence may bring upon others, may be called in by love of duty to aid in opposing the appetite in question, and the combined force of these motives may be sufficient to withstand the temptation which would have proved too much for love of duty had it stood alone.

On the principle stated above that motives are strengthened by the acts they give rise to, the resulting conquest in the case just given will weaken the force of the appetite and increase in the same proportion that of its conquerors. The strength which accrues to the moral motive will be less of course than what it might have gained if it had been strong enough to accomplish the whole task for itself. It will nevertheless have made a definite advance, whereas, if it had risked an encounter single-handed, it might have been worsted, and as an inevitable consequence weakened—part of its strength being taken from it and made over to the conquering appetite.

We see, then, from this example what is the general nature of the service which other motives can render to the moral motive or love of duty. They have it in their power to assist in its progress and development by equalising its work to its capacity. Their help is equivalent, in fact, to the postponement of part of a too difficult task to a more convenient season. They take to themselves part of the force which the moral motive is attempting to resist, and their value is greatest when the part thus taken is the amount precisely by which the task of duty was before in excess of its power.

If *more* than this be taken, the love of duty will perform less work than it might otherwise have done, and the time of its complete ascendancy will therefore be needlessly postponed.

If *less* than this be taken, the love of duty will sustain a defeat; part of its strength will pass from it to its conqueror; the sum total of force to be resisted and overcome in the future will be to the same extent increased, and the period which must elapse before perfection is finally reached will consequently be still further prolonged.

Moral progress, therefore, is seen to proceed by a series of compromises, and it is as the means of effecting these compromises that the motives, which as opposed to love of duty we may call "non-moral," are to be valued. Their goodness is founded on man's moral infirmity, which obliges him to have recourse to aids and means in the attempt to subdue the lower impulses of his nature. Too weak to mount at once to the supreme control of life, the love of duty "stoops to conquer," and avails itself of the assistance of inferior motives in proportion to the greatness of its need. As this need must be ever varying according to the amount of success or defeat before sustained, it follows that the "non-moral" motives can have no fixed and absolute value, but must always depend in the last resort upon conditions of time and place.

They have that passing value only which belongs to forms and systems of government, and it is as incorrect to attribute *absolute* moral worth to any motive but the pure love of right and duty as it would be to speak of "absolute and immutable rights," and "the natural liberties of mankind," after the fashion of eighteenth century politicians.

It follows again from this that experience alone can be our guide when we would judge of the extent to which our regard for duty requires to be aided by inferior motives, and to it alone must we look for the means of determining the precise time and manner in which this assistance should be rendered.

From the history of past failures and successes we form a general idea of the degree of strength which should belong to

different motives in order to enable the work of moral development to proceed most rapidly, and we are guided by this in deciding what part of our nature to cultivate most assiduously. We remember, for example, that, when temptation would otherwise have proved too strong for our weak sense of duty to resist, we have been saved from falling by the timely aid of the affections. The thought of bringing misery on some loved one has held us back from sin when nothing else could have availed to save us, and henceforth we cultivate these affections, not only for their gracious influence in sweetening life, but that they may be ever at hand to lend their aid when similar temptations beset us.

And in the same way with regard to the various other motives by which men's conduct is governed, experience points out to us the circumstances and conditions under which they are best able to afford assistance to the moral motive. It shows that at certain stages of a man's life particular desires attain to a dangerous degree of power, and suggests the means by which they can most successfully be met, and their gradual subjugation by duty be ensured.

For example, the opponents which duty has most reason to fear in youth are the appetites and passions, and its first energies should therefore in most cases be given to the cultivation of what Hume has somewhat inappropriately termed the "calm passions". In later life, again, the moral motive finds itself assailed by quite another set of adversaries whose influence is even more to be dreaded. Avarice and selfishness are motives which commonly gain in strength as life advances. In youth they are seldom very dangerous, being held in check by the spontaneous action of other impulses; but in after years the moral motive has no more formidable adversary to contend with. The cultivation of the domestic and social affections by acts of kindness and thoughtfulness for others will commonly be found the most effectual means of meeting these foes of duty, and it is of the utmost importance that the attempt to repress them should not be deferred till the character has formed and hardened round them.

Thus we see that motives of every kind have a different value at different periods of life, and in exactly the same way with regard to the larger life of the race, we see that their relative importance varies from age to age according to the kind and amount of service that is required of them. In early barbarous times man's feeble sense of duty has to struggle with rude and debasing passions, and a regard for simple justice is seen to be of such essential service in aiding in this contest that it is not unnaturally taken to be the highest, and in some cases the sole,

motive having moral worth. It covers, in fact, almost the whole field of morals, and is even identified at times with the moral motive to which it renders such invaluable assistance.

Mercy, benevolence and charity are motives which come to be esteemed only in later times when this contest has been decided in favour of justice. The relation in which they stand to this latter motive in respect of moral progress is exactly similar to that in which a constitutional government stands to an unlimited despotism. They succeed to the position which justice held before, as the ally of the moral motive or love of duty, and will retain this position and continue to have moral worth ascribed to them until such time as duty shall have gained sufficient strength to stand alone and take upon itself the sole direction of life. As, in our present state of imperfection, we have never enough of these motives to aid the love of duty in its work of conquest, it is only natural that we should be apt at times to forget their true nature and look upon them as having an *absolute* moral worth of their own.

In reality, however, their value is *relative* and *temporary* only, just as is that of the constitutional government to which I have compared them, and it will necessarily become less and less as the state of final perfection is approached. Our sense of duty requires aids by reason only of its weakness, and accordingly as it gains in strength, the value of such aids—whether supplied by ourselves or others—must, *pari passu*, be diminishing.

I say "whether supplied by ourselves or others," because it is obvious that the work of adjusting and combining the "non-moral" motives to aid in the development of the moral motive is one in which men have the power to render valuable assistance to one another.

The value of every human institution rests ultimately on the power which men possess of calling out motives in others as well as in themselves, and on the fact that increased effect is given to this power by the co-operation which institutions imply. Co-operation and "division of labour," it is important to bear in mind, are of no less importance in their moral than in their industrial aspect. Just as, in order to bring about the particular combination of natural forces which is needed for some industrial process, men are accustomed to unite their powers and thereby act with almost indefinitely greater effect, so—in the similar work of combining motives in order to enable the love of duty to raise itself to the position which of right belongs to it—it is of the utmost importance that men should not isolate their efforts and work each for himself, but that their united powers should be directed to the common progress and development of all.

It is important that this point should be clearly understood, as it is here that the theory I am advocating differs most essentially from another which in some respects it resembles.

It has not unfrequently been maintained that the moral quality of an act must be judged of by its effect on the inward motives and dispositions which make up a man's character; but in proceeding to apply this test it has been common to limit the attention to the particular motive or set of motives which prompted the act in question. This, however, is far too narrow a view to enable us to give a correct and decisive judgment. So long as any man's sense of duty stands in need of assistance from without, and has not sufficient strength to do its work alone; so long as mutual aid remains a thing to be hoped for, and mutual injury a thing to be feared—so long will it be necessary, in judging of the quality of an act, to take account of other things besides its effect on the agent. The strengthening in him of the motives which led him to act is always a point to be considered, but it is in no case the only point, and is in fact but one of many consequences, all of which must be allowed to have their due degree of influence when the final judgment has to be given. To take a simple example which will bring out my meaning more clearly, let us suppose that a man has contributed to a charity from selfish motives, such as a desire to stand well with his neighbours or to gain a reputation for philanthropy. How, on the principles I have just been laying down, is the morality of such an act to be judged of? As far as the man himself is concerned it is plain that no good result whatever can be expected to follow. On the contrary, having yielded to a selfish and worldly motive, he has strengthened its hold upon him for the future, and has made selfishness more than ever a part of his nature. The work which his sense of duty has to accomplish is thereby increased, and the time of its fulfilment deferred, and it may seem therefore as though we have no choice but to condemn his act as altogether bad.

It has, however, another set of consequences which we must not omit to notice, and which may be found to give it an entirely different complexion.

The money he has thus unworthily given may be applied to purposes which will make it easier for others to withstand temptation and enable *their* love of duty to develop itself at a rate which would otherwise have been impossible. Extreme poverty implies an amount of temptation which duty must always find it hard to overcome, and the good which is done by the gift in lessening this resistance and averting the risk of failure may more than outweigh the harm which is sustained by the moral character of the giver. In short, it is the increase or diminu-

tion of the sum total of love of duty which exists in the world that we must in all cases look to as our test of the moral value of actions, and it will not do to limit our inquiry to the immediate effect upon the agent.

So far as the agent is concerned, that act is of course best which is prompted solely by a regard for duty, as the strength of this motive is thereby directly increased. But, just as we have seen that acts prompted by bad motives may yet be pronounced good rather than bad upon the whole, so, on the other hand, acts prompted by pure desire of right may have to be condemned as bad in view of their general consequences; for the increased strength which love of duty has gained in one quarter may be less than the amount by which it has indirectly been diminished in another.

Thus a conscientious persecutor may cut off by his misdirected zeal for duty a life which was being guided by this motive no less than his own, and which was aiding besides by its example and influence in uplifting thousands to the purity it had itself attained.

The moral value of actions, again, will often have to be determined by results which will appear exceedingly remote. Thus, a certain amount of physical exercise may be held to be morally desirable because it leads to increase of strength and vitality, which again make it easier for love of duty to accomplish its appointed task. Everything, again, that tends to preserve life is *primâ facie* to be valued, as it is life alone and the power of acting implied in it which affords the opportunity for the moral faculty to develop itself. I say *primâ facie*, because I do not hold that life itself is always a thing to be valued and held in reverence. Its worth depends in all cases on the use that is made of it, and if this is base and unworthy—if instead of leading to increase of moral power, it is so employed as to extinguish this power or lessen the influence which it before possessed—I maintain that life is a curse and not a blessing to the world. We rejoice when a new life comes into the world, because we know what infinite hopes and possibilities lie within it, but when the tenor of this life is disclosed and is seen to be opposed to moral progress, the reason for our rejoicing is taken away, and we rightly esteem it no longer. Life, in short, is only a *means*, just as all other things are means except the righteous will of Him who made them, and the love of duty which is its reflection in men's minds; and to secure the sole dominion of this will over the whole field of action should be the ultimate end and object of all human endeavour.

And as we plainly have not strength to shake off at once the influence of inferior motives and guide our life by conformity to

this will alone, we must be content to mount by degrees and to make use of means and aids when our reason tells us that we cannot rise without them. These means consist chiefly, as was before remarked, in the regulation and adjustment of the "non-moral" motives by the moral. If skilfully employed and brought forward at the right moment and in the right degree of strength, the work of overcoming the former and mounting by their aid will be comparatively short and easy, and the final triumph of the divine over the human element of man's nature may be looked upon as assured.

If, on the other hand, no such proper order is observed—if the love of duty has no definite aim and plan for its development, but rushes madly at temptation whenever it meets it—if, without making use of the means and aids which lie around it, it attempts what is clearly beyond its strength—it may postpone indefinitely the day of its final triumph, and even render it doubtful whether such a day will ever come at all.

The course of men's moral progress, in fact, lies midway between two extremes. On the one hand, as every time he yields to inferior motives he strengthens them, and so puts off the time of their final subjugation by duty, their assistance should never be called in except when there is absolute need for it. Every needless resort to them has the effect of postponing the arrival of perfection. It implies that two or more acts are done when one would have been enough, and is therefore directly opposed to what may be called the first principle of moral economy.

For example, when love of duty and self-interest have combined to produce an act, the strength gained by the former motive will obviously be less than it would have been had duty been the sole impelling motive. Self-interest itself will remain to be struggled with and overcome, and it will be all the more formidable as an adversary of duty from the strength which it has gained as its ally.

The other and opposite danger which we have to avoid is that of attempting too much and imagining that our sense of duty can dispense at once with the aid of inferior motives. Just as some men are unduly impressed with a sense of their moral weakness, and are always casting about for other motives to back up and support their sense of right which they are afraid to trust alone, so in the opposite direction there are others who think that their sense of duty is above the need for such extrinsic aids, and who neglect in their haste to reach perfection the only means by which it can be attained.

They starve the affections and dwarf and impoverish their faculties in a vain attempt to exalt their moral nature and mount at once to a state of glorified perfection. The result of

this unnatural forcing soon, however, makes itself apparent when temptations and difficulties have to be faced, and such men will not unfrequently be found to have failed in the end for want of those very qualities which their zeal for perfection had taught them to despise.

These then are the two opposite dangers between which we have to steer our course. The ultimate effect of each is one and the same, and moral progress is almost equally retarded by them. Every fresh advance of knowledge is teaching us better how to avoid them. We learn gradually, and often as the result of bitter experience, how life can be made to yield the greatest increase of moral power, and how the opportunities of action which it affords can be turned to the best account.

We come to see that there is a value and use as means to perfection in many things which at first sight seem utterly purposeless, and we learn more and more, as time goes on, the changing conditions of time and place on which this value depends. We see that if rightly used there is a power for good in all created things, and that every motive and impulse of man's nature can be made to assist in the work of his final glorification, and in bringing about that state of things when love of right alone shall rule him.

To what purpose our moral energies are destined to be put if they shall ever have completed their present task and vanquished and subdued all inferior motives, we cannot even pretend to guess; but, if we believe that there is a real positive purpose underlying the work of the Deity in the universe, and that he is not merely engaged in removing difficulties of his own creation, it is only natural to hope that when we have brought our powers into harmony with his will we shall be allowed to employ them in the furtherance of his work.

THOMAS THORNELY.

V.—JEWISH MEDIÆVAL PHILOSOPHY AND SPINOZA.

THE ancient Jews cannot be said to have been a philosophic people. Their function in the world's history was religious rather than speculative, while philosophy was a later growth among them, and did not spring up till after the prophetic intuition had become dim, and the race had felt the influence of foreign surroundings. Despite their national exclusiveness, the Jews have always shown a wonderful power of assimilating the

conceptions of others.[1] They brought new ideas away with them from Egypt and from Babylon; and when Greek conquest along with Greek culture broke the outer wall of Judaism, and Jew met Greek in the market-place of Alexandria, Hebrew religion received a fresh impress from the spirit and methods of Athenian thought.

But the time was not yet ripe for a Judæo-Greek philosophy, and Philo's system was soon forgotten by his countrymen. The Jews had to be driven from their fatherland, and their temple had to be destroyed, before they could look on doctrine as taking the place of the old external bonds of national unity.[2] Moslem religion and power had to be founded before they both saw the necessity and had the opportunity of wedding their doctrine to speculation. The necessity was to defend their own against a rival system; the opportunity lay in the scientific movement introduced by the Caliph Almamun (reigned at Bagdad, 813-33), and the translations from Aristotle and Neo-platonic writers executed under his direction.[3] The Jews participated in this movement, and Aristotelianism neglected in the land of its birth was perpetuated by them and their Moslem rulers. Drawing from the same sources, and busied very much with the same questions, these two Semitic races carried on the work of philosophy together, till the sudden extinction of Arabic culture[4] left the Jews to follow out the results alone, and to hand them on to the Christian Scholastics.

Upon the Jewish thinkers three chief influences were at work: that of Aristotelianism, which soon became the predominant philosophy; that of Neo-platonism, which almost entirely moulded some systems, and left traces perhaps upon all; and that of the Hebrew Scriptures and the mass of traditional interpretation by which they were overlaid. According as one or other of these influences gained the ascendancy, Jewish philosophers[5] may be divided into schools.

[1] Cf. Eisler, *Vorlesungen über die jüdischen Philosophen des Mittelalters*, II. 2.

[2] Cf. Graetz, *Geschichte der Juden*, V. 155.

[3] For an account of these see Munk, *Mélanges de phil. juive et arabe*, pp. 313 ff.

[4] Cf. Renan, *Averroès et l' Averroïsme*, 3me éd., p. iii.

[5] Among them may be mentioned: Saadia (called in 928 to be Gaon or 'bearer of dignity' in the Jewish College at Sura in Babylonia), Ibn Bachja of Saragossa (11th century), notable for his defence of the divine unity, Ibn Daud (1110-80), in whom Peripateticism had already become supreme, Moses ben Maimun or Maimonides (born at Cordova, 1135, died in Egypt, 1204), called by Graetz the "intellectual king of Judaism," and Levi ben Gerson or Gersonides (1288-1340). The Neo-platonic influence is shown

It would of course be impossible to give a full account here of the problems they dealt with. But, as an attempt to reconcile the philosophic with the religious standpoint, much of the most important speculation of all the schools circled round the two questions: (1) What is the nature of God? or, how are we to harmonise the notional unity of Greek philosophy with the personal unity of the God of the Jews? (2) What is God's relation to the world—Is He its transcendent cause, or immanent essence, or the source from which it emanates? and how can the doctrines of the philosophers on these points be made to agree with the Biblical history of the Creation? To these two questions the different schools of thought gave varying answers.

On both of them the progress of thought manifested by the Aristotelian and Neo-platonic schools tended to a fuller appreciation of Greek speculation, and an emptier conception of Jewish religion. And though a modern Jew thinks that the Aristotelian philosophy acted "like a refreshing morning wind, cooling the close and sultry atmosphere of faith,"[1] the boasted reconciliation of the two forces was only brought about by the reduction of one of them to the other, and it need hardly be said that it was not philosophy that gave way.

(1) The most striking example of this reduction of Judaism to philosophy is shown in the treatment of the divine attributes. Not only the Peripatetic school but those also who may be classed as Neo-platonists agreed in denying that the attributes ascribed to God even by the sacred writers really belonged to Him. This denial of the attributes, which is of Alexandrian origin and has been traced to the Book of Wisdom,[2] found its fullest development in the doctrine of "negative attributes" borrowed by Maimonides from Ibn Sina.[3] Certain qualities

most plainly by Ibn Gebirol of Malaga (born 1021), the Avicebron of the Scholastics, by Ibn Zaddik of Cordova (1080-1148), and by Abraham Ibn Esra (1088-1167), the Biblical commentator, as well as by the authors of the *Sohar* and other Kabbalistic works. The ruling philosophies were criticised from an orthodox point of view by Jehuda Halevi of Old Castile (born 1086), and by Don Chasdai Creskas of Saragossa (1340-1410), with whom and his pupil, Joseph Albo (1380-1440), Jewish mediæval philosophy may almost be said to close.

[1] Sachs, *Religiöse Poesie der Juden in Spanien*, p. 188.

[2] Munk, *Mélanges*, p. 465.

[3] Cf. Weil, *Phil. religieuse de Lévi-ben-Gerson*, p. 199. Maimonides's doctrine of the attributes was opposed by Gersonides (*Ibid.* pp. 121 ff., 202 ff.). In other respects, however, the latter adopted the theories of the Arabian Aristotelians to a greater extent than any previous Jewish thinker. Cf. the points mentioned by Munk, *Mél.*, pp. 318-9, with Weil, *Phil. rel.*, pp. 230 ff., 114, and 35 ff. Gersonides maintained the eternity of matter, and limited the knowledge of God to genera, but rejected the Averroïstic doctrine of the active intellect.

called the essential attributes had held a doubtful place in earlier systems. "God," says Saadia, "has assured us by His prophets that He is one, living, powerful, and wise,"[1] though these qualities are not distinguishable from His essence which is only known to us in its unity.[2] But Maimonides argues that, by asserting qualities essential to God's nature and existence, we deny His unity, while, by asserting qualities not necessary to His existence, we deny His immutability.[3] God, he contends, is indefinable because not composed of genus and difference, and "there can be no true relations between God and His creatures, since the characteristic of two notions in relation is complete reciprocity."[4] All predicates applied to the Deity are thus but so many ways of expressing what we do *not* know of Him; and "the true way of denoting God is by the negative attributes which can communicate nothing as to the nature of their object."[5] We cannot affirm a perfection, we can only deny an imperfection. All we can know of God is His necessary existence. "This," says Kaufmann,[6] "is the beginning and end of Maimonides's theology." His altar is erected *ἀγνώστῳ θεῷ*.

The personal God of the Jews is thus reduced to the unreal abstraction of indeterminate and indeterminable being, and the *νοῦς ποιητικός* or higher intellect of man, which, according to Maimonides, has for its object the knowledge of God,[7] is yet unable to apply to Him any of those categories which alone render cognition possible. This idea of God—Neo-platonic in nature and in its historical origin—is, however, not without relation to the Jewish creed; and the divine unity taught by the latter had only to be accentuated in an abstract one-sided way to result in a denial of the divine attributes.

The tendency of the Christian Schoolmen was to follow an opposite but scarcely more satisfactory course. Developing in an uncritical manner the fuller conception of God furnished by their religion, they avoided the empty abstraction of qualityless Being only to land themselves among the contradictions of a God defined as the most real being and substratum of all positive attributes. Spinoza's view of God is related both to the Chris-

[1] Eisler, *Vorl.* I. 7; Kaufmann, *Gesch. d. Attributenlehre in der jüd. Religionsphil. des Mittelalters*, 1877, p. 15.

[2] Kaufmann, *Gesch. d. Attr.*, p. 29.

[3] Cf. Franck, *Dict. des sciences phil.*, 2me éd., p. 1032a.

[4] *Moreh Nebuchim*, I. 52., Buxtorf's Latin transl., p. 81; cf. Kaufmann, *Gesch. d. Attr.*, p. 388; Eisler, *Vorl.* II. 43.

[5] Kaufmann, *Gesch. d. Attr.*, pp. 429-30.

[6] *Ibid.*, p. 471; cf. Eisler, *Vorl.* II. 46.

[7] Cf. Franck, *Dict.*, p. 999 b.

tian and to the Jewish idea. With the former he defines God as possessed of infinite attributes[1]; with the latter he rejects all ascription to Him of human or other qualities which exist in a determinate manner and therefore partake of negation.

It was against this denial of the attributes that Creskas directed his criticism, arguing that, though the attributes of God do not exist in Him as many, He is not a mere qualityless Being, since notional plurality is not inconsistent with real unity.[2]

(2) With regard also to God's relation to the world, Creskas attacked the positions of the other two schools. Though almost all the Jewish philosophers admitted the doctrine of creation *ex nihilo*, the admission was made rather out of compliment to faith than as a result of speculation. The views of Maimonides on the subject are essentially Aristotelian, although he not only admits this doctrine but also introduces Neo-platonic elements into his system. The Deity, according to him, is separated from the universe[3] as well as from human cognition, and though not Himself in contact with the sphere of the heavens, is yet "the author and cause of the first intelligence that moves the first sphere".[4] God, he holds, is the world's transcendent cause.

On the other hand both Ibn Gebirol and the Kabbalists substitute an emanational doctrine for this theory of transcendence. In Gebirol's system, the supreme being with its essential attribute,[5] the Divine Will or Creative Word,[6] first produces the simple substances[7]—universal matter and form,[8] universal intellect compounded of these, the three universal souls (intelligent, vital, and animal), and nature, the lowest of these simple substances, a force above the corporeal world, producing and governing it.[9] According to the Kabbala again, the qualityless En-soph or Infinite first manifests itself in the macrocosm or Adam Kadmon (the protoplast of the universe)—which, like Ibn Gebirol's 'nature,' has been compared to the 'natura naturans' of Spinoza, and from which proceeds the world of emanation with its ten potencies or Sephiroth, and thence the three worlds of creation, formation, and making, of which the human soul partakes.[10]

Against these Kabbalistic hypostases as well as against Peripate-

[1] *Eth.* I. def. 6. [2] Joël, *Don Chasdai Creskas*, p. 31.

[3] *Moreh*, I. 72., p. 147.

[4] *Moreh*, II. 4, p. 197; cf. I. 72, pp. 141, 145-7.

[5] *Extraits de la Source de Vie*, V. 67 (translated by Munk, *Mél.*, pp. 6-148).

[6] *Ibid.*, I. 3. [7] *Ibid.*, III. 3. [8] *Ibid.*, III. 21.

[9] Munk, *Mél.*, p. 228.

[10] Cf. Franck, *Dict.*, p. 852a, Munk, *Mél.*, pp. 492 ff.; Graetz, *Gesch. d. Juden*, VII. 78 ff.

tic abstractions, Creskas attempts a critical defence of the orthodox view, upholding the doctrine of the creation of the world and of its constant dependence on God.[1] Whether the creation took place in time or was from all eternity is, he holds, a matter of secondary importance. The point to be emphasised is the divine creative activity, not the period of its exercise,[2] though "the full truth is the traditional that God created at a definite time".[3]

The different doctrines of God and His relation to the world held by the various Jewish schools of thought are now apparent. The Aristotelian or leading school denied the divine attributes, and looked upon God as the world's transcendent cause. The thinkers more influenced by Neo-platonism also denied the divine attributes, but regarded all that exists as proceeding from the primal source by a series of emanations. The critical or reactionary school—at any rate, as represented by Creskas—affirmed the existence of attributes in the Deity, and, while asserting the absolute creation of the world, held that God is in all its parts bearing and sustaining it.[4] With each of these schools Spinoza's system has been, at one time or another, brought into connexion; but there were influences at work on the Jew of Amsterdam which gave his thought a different cast from theirs.

The Jewish philosophy of the middle ages had at least one point in common with the whole of mediæval thought. It was a scholastic rather than an original system; its problem was given to it from without, not worked out by it from within. But Spinoza is the determined foe of the scholastic presuppositions both of Jews and Christians, and in him philosophy, banished from the synagogue without being admitted into the church, seeks an independent footing in thought.

Spinoza was thus in a radically different position from that of his Jewish predecessors. Their problem was to reconcile the philosophy of the schools with the creed of the synagogue; but his task was a different one. What might have been the case had the Rabbinical college dealt otherwise with him, or had he been easier to deal with, we cannot tell. But the ban that cut him off from his people placed him at the head of modern philosophy. He rid himself of the presuppositions of Rabbinical tradition, as Descartes had rejected the assumptions of Christian Scholasticism—and for the same reason: he would accept nothing as true which he could not clearly and distinctly see to be true. He assimilated the Cartesian philosophy, removed its inconsistencies, and resolved its dualism into a higher unity.[5]

[1] Joël, *Creskas*, p. 24. [2] *Ibid.*, p. 67. [3] *Ibid.*, p. 70. [4] *Ibid.*, p. 24.
[5] Cf. Hegel, *Gesch. d. Phil.* iii. 411: "Spinozismus ist Vollendung des Cartesianismus".

But this view of Spinoza's philosophy as an original advance on lines laid down by Descartes has been by no means the only theory of the historical origin of his thought. Already, in his own century, a critic spoke of his system as having "arisen from the Jewish, though neither quite at one with it nor very different from it;"[1] and, within recent years, the attempt has again been made to trace his philosophy to Hebrew sources. It is worthy of note, however, that, whereas he was formerly spoken of as a pupil of the Kabbala, modern critics seek to affiliate him to Creskas and his Aristotelian opponents. And circumstances have of late arisen which have been thought to favour this opinion.

On the one hand, the recent important researches into Jewish mediæval philosophy carried out by Munk, Joël, Graetz, Eisler and Kaufmann have brought into notice many points of similarity to Spinozistic doctrines previously unknown. On the other hand, the discovery and publication in 1862 of a lost treatise of Spinoza's—the *Tractatus brevis de Deo et homine ejusque felicitate*—has cast a new light on the growth of his philosophy. In the *Ethica* we must, so to speak, read his system, as he says reason regards its objects, "sub quadam aeternitatis specie"; but from the *Tractatus brevis* we are enabled to some extent to see how it gradually arose in the mind of its author.

From the development of thought exhibited by this treatise, and from his own intimate acquaintance with the literature of his people, Dr. Joël of Breslau has attempted to show that the impulse for Spinoza to transcend Cartesianism and the material for the new metaphysical system he formed were received from his Jewish predecessors.[2] The same view is adopted by Dr. Ginsberg,[3] Spinoza's most recent editor, and has of late begun to be talked of as a point established. It may be worth while, therefore, to examine the grounds on which it rests.

There can be no doubt of the importance of the *Tractatus brevis* for tracing the historical sources of Spinoza's thought. It is, in all probability, the earliest at any rate of his esoteric works that we possess, and it covers the same ground as the later *Ethica*. A comparison of these two works shows that they agree

[1] J. G. Wachter, *Der Spinozismus im Jüdenthumb* (1699), part III. p. 2.

[2] Joël, *Zur Genesis der Lehre Spinoza's mit besonderer Berücksichtigung des kurzen Tractats* (1871), pp. 2-5; *Don Chasdai Creskas' religionsphilosophische Lehren in ihrem geschichtlichen Einflusse dargestellt* (1866), pp. 71-5. In the collected edition of these and other papers, by Dr. Joël (*Beiträge zur Gesch. d. Phil.*, 2 vols., Breslau, 1876) the paging of the separate issues is retained.

[3] *Ethik des Spinoza im Urtexte*, Einl. pp. 31, 37. A brief statement of some of Dr. Joël's positions is given in Mr. F. Pollock's article, "Notes on the Philosophy of Spinoza," MIND X.

both in the premisses on which they build and in their ultimate conclusions, and that their differences are such as might naturally be looked for between the first statement of a new philosophy and its matured expression. Both show that Spinoza was working on Cartesian lines, but in both he has already adopted the distinctive points of his own theory. The definition of God and His necessary existence, the impossibility of there being two substances of the same kind, or of one substance producing another—the propositions from which the leading conclusions of his system necessarily follow,—as well as his distinctive ethical positions of good and evil as mere *entia rationis*, and of the strict determinism of the will;—all these points which we rightly look upon as marking off the Spinozistic philosophy from the Cartesian are already found in the *Tractatus brevis*. It differs from the *Ethica* less in the propositions proved than in the proofs it gives for them.[1] The earlier work is more concerned in defending its positions dialectically against ordinary or opposed views, while it is the chief aim of the later exposition to bring every particular doctrine to the unity of system, and to make each proposition depend by strict deduction on what precedes, leaving all necessary references to other theories to be dealt with in scholia or appendices. The mathematical method is almost foreign to the one treatise; the other is an "ethica ordine geometrico demonstrata," in which Spinoza discusses God and the human mind, the nature and strength of the affections, and the actions and desires of men "just as if the question were of lines, planes or solids".[2]

But, although the two works differ in no important point of doctrine, the development and application of the new theories adopted are less consistently carried out in the earlier and shorter discussion. And while every trace of hesitation or inconsistency has disappeared from the *Ethica*, statements irreconcilable with its fundamental positions may still be found in the preliminary sketch.

Were the theory of Dr. Joël and others correct, we might expect these points of divergence between the two works to betray the Jewish origin of Spinoza's thought. But it is not so. For in the *Tractatus brevis* he is nearer Descartes than he is in the *Ethica*, as will be made apparent by considering the chief points in which the two expositions differ.[3]

[1] Contrast *Tract. brevis*, I. 1 with *Eth.* I. 12, and *Tr. br.*, I. 2 with *Eth.*, I. 6; cf. Trendelenburg, *Hist. Beiträge zur Phil.*, III., 314, 357.

[2] *Eth.* III. praef., ed. Ginsberg, p. 161.

[3] These points are mentioned by Sigwart, *Spinoza's neuentdeckter Tractat* (1866), p. 96, and by Trendelenburg, *Beiträge*, III. (1867), p. 361.

(*a*) If in the *Tractatus brevis*, he speaks of mind and body as acting on one another,[1] whereas, in the *Ethica*, they are shown to be completely distinct from, though they completely correspond with, each other,[2] it is because he has not yet got rid of Descartes' conception of the soul as moving the animal spirits from its seat in the pineal gland.[3] (*b*) And if in the former work he still seems to regard knowledge as passive,[4] though he afterwards identified action and intellectual cognition,[5] this is but the obverse side of the same theory, according to which the soul is not only able to produce or direct the motion of the animal spirits, but is also the recipient of impressions from without.[6] (*c*) If, lastly, the doctrine of final causes has left its traces in more than the language of the *Short Treatise*,[7] and the "ens summe perfectum"[8] has not yet yielded its place to the "ens absolute infinitum,"[9] it is because the exclusion of the conception of ends, not only from physics, as had been done by Descartes, but from philosophy altogether, has not yet been fully carried out.

But in all these points Spinoza's thought has already implicitly adopted the advanced position, to which Descartes himself may be said to have shown the way. (*a*) The complete correspondence of idea and reality, as already stated in the *Tractatus brevis*,[10] points beyond the theory of their interaction. For this latter hypothesis is utterly inconsistent with the view that extension and thought are the two attributes of the one substance, having nothing in common with each other,[11] and had only seemed defensible even to Descartes by an appeal to the omnipotence of God.[12] (*b*) But if mind cannot act on body in the production of motion, it may be shown in the same way that body cannot act on mind by the production of thought. And Dr. Joël has

[1] *Tr. br.*, II. 19. [2] *Eth.*, III. 2, II. 7.

[3] Descartes, *De passionibus animae*, I. 34, 43, etc.

[4] *Tr. br.* II. 15, ed. Van Vloten (1862), p. 159, ed. Sigwart (1870), p. 99, II. 16, ed. Vloten, p. 167, ed. Sigwart, p. 105.

[5] *Eth* IV. 24, dem: "Nos eatenus tantummodo agimus, quatenus intelligimus."

[6] Descartes, *De pass.*, I. 34, 43, &c.; Spinoza, *Tr. br.*, II. 19, ed. Vloten, p. 185, ed. Sigwart, p. 117.

[7] See *Tr. br.* II. 24; cf. Trendelenburg, *Beiträge*, III. 365.

[8] See *Tr. br.*, I. 2, 4, 6; cf. Descartes, *Princ. phil.* I. 17, 18.

[9] *Eth.* I. def. 6; *Epist.* 64, ed. Ginsberg, p. 178; also *Ep.* 41: "perfectionem in τῷ *esse* et imperfectionem in privatione τοῦ esse consistere; cf. Trendelenburg, *Beiträge*, III. 327, II. 50.

[10] *Tr. br.*, II. 20, n.3.

[11] *Tr. br.* II. 20, ed. Vloten, p. 197, ed. Sigwart, p. 125.

[12] Cf. *Med.* vi. p. 45; *Resp. Sextae*, pp. 166-7 (ed. of 1663).

drawn attention to a passage in the *Tractatus brevis*,[1] in which Spinoza anticipates his later theory of the activity of intellect. Joël,[2] indeed, seeks to explain the description of intellect as 'passio,' by a reference to Creskas. But the reference is altogether superfluous. For in the passages in which Spinoza speaks of intellect as passive, he is following the doctrine of Descartes,[3] and when he looks upon it as active, he is still indebted for his theory, and even for his language, not indeed to Descartes, but to a Cartesian manual.[4] (*c*) Lastly, the doubt that Descartes had cast on the teleological view of man as the final end of creation leads even in the *Tractatus brevis*[5] to the separation of the ends of nature from the ends of man, and to the denial of any final cause outside the divine laws, and results in the *Ethica*[6] in Spinoza's discarding from philosophy altogether the notion of final cause which Descartes had banished from physical science as "plane ridiculum et ineptum".[7]

A point in the *Tractatus brevis* to which attention has been drawn is the prominence given to the notion of Nature; and Prof. Sigwart has expressed the opinion[8] that not only does it "appear as an independent point of departure beside the notions of God and substance," but that "in the development of the treatise . . . the proposition 'God is the one substance' proceeds first from this 'Nature is God'."

But while this notion is certainly more conspicuous in the *Tractatus brevis* than in the *Ethica*, it does not occur in the first letter to Oldenburg (1661), the earliest of Spinoza's writings on the subject of whose date we can be certain. Yet from the

[1] I. 2. ed. Vloten, p. 33, ed. Sigwart, p. 23.

[2] *Zur Genesis der Lehre Spinoza's* (1871), p. 62.

[3] *De pass.*, I. 17, where the term "passiones" is applied to "omnes species perceptionum sive cognitionum quae in nobis reperiuntur".

[4] As I have not seen this fact noticed in any discussion on the subject, it may be well to quote the passages referred to. In *Tr. br.*, I. 2, Spinoza speaks of "the intellect which, as the philosophers say, is *a cause of its own conceptions*," and, being a "causa immanens," has not the imperfection of passivity. In Adrian Heereboord's Ἐμπειρία *Logica* (on which, as Trendelenburg has shown, the discussion in *Tr. br.* I. 3 is founded), Lib. I., c.xvii., ed. 4, 1660, p. 117, "causa immanens" is defined as that "quae producit effectum in se ipsâ. *Sic dicitur intellectus causa suorum conceptuum*". Cf. F. Burgersdicii, *Institutiones Log.* (1626) Lib. I., c.xvii, p. 89: "At cùm anima nostra intelligit, aut appetit aliquid, *dicitur causa immanens suorum conceptuum*, aut affectuum, quos intelligendo et appetendo format." Heereboord, it may be noticed, also so far agrees with the Cartesian position as to speak of intellect as in a sense passive: "Intelligere est quoddam pati".—*Meletemata phil.*, ed. ultima, 1665, I. 169a.

[5] II. 24, ed. Vloten, p. 215, ed. Sigwart, pp. 136-7.

[6] I. App. [7] *Princ.* III. 3; cf. I. 28.

[8] *Spinoza's neuentdeckter Tractat*, p. 17.

three propositions[1] laid down in that letter, and afterwards placed first in the second chapter of the *Tractatus brevis*, coupled, as the writer says they are to be coupled, with the definition and existence of God—the burden of the first chapter of the same treatise—the conclusion is obvious enough that no substance can exist outside of God, that He is the one substance. And this is proved without the intervention of the notion 'nature'. It is true that 'nature' enters in the next proposition of the *Tractatus brevis*[2] apparently as an independent notion, not so much deduced from 'substance' or 'God' as an expression for the totality of the real with which the one substance must be identified. But it is only in the first dialogue,[3] too uncertain in date and relation to the rest of the treatise to serve as the foundation of an argument, that the unity and infinity of nature seem to be established on an independent basis. So far as the main line of reasoning is concerned, 'nature' holds a secondary rather than a primary place.

Admitting, however, its independence in Spinoza's thought, and the importance of its identification with the notion of God, we have still to ask whether it can be traced to Jewish sources. Spinoza has been supposed to be largely indebted to the Kabbala,[4] and Wachter tried almost to identify his system with the *Sha'ar Hashemaim* or *Porta Cœlorum* of Abraham de Herrera (Irira). But it is inexact to say that both regard God and nature as the same. That is true of Spinoza alone; for, in the Kabbala, nature is not the En-Soph, but proceeds from it by a series of emanations.[5] The source from which all things spring is not one of their number, nor all of them together, but infinitely above them all. In the Kabbala, God is the transcendent source of the emanations from which the world arises, whereas in Spinoza He is the immanent cause or essence of the universe.

It is true that, in one place,[6] Spinoza speaks of God as "causa emanativa," but Trendelenburg has shown that, throughout the whole discussion in which this expression occurs, he is referring

[1] The corresponding propositions of the *Ethica* are I. 5, 6, 8.

[2] I. 2, ed. Vloten, p. 23, ed. Sigwart, p. 16.

[3] Cf. Sigwart, *Spinoza's neu. Tr.*, pp. 17 ff., and German ed. of the *Tr. br.*, Prolegg, pp. xxxvii. ff. The latter of these passages seems in agreement with what is said above.

[4] J. G. Wachter, *Der Spinozismus im Jüdenthumb*, part III., p. 60; F. H. Jacobi, "Briefe über die Lehre des Spinoza," *Werke*, IV., i. p. 56.

[5] Cf. *Porta Cœlorum*, Latin transl., 1678, Diss. I., c. 4, §§ 8-16: "principium sine principio . . . non est Natura"; §§ 18-19: "omnia etiam emanasse ab Uno simplici et perfecto; et omnia ad unitatis naturam aspirare et agi."

[6] *Tr. br.* I. 3, ed. Vloten, p. 53, ed. Sigwart, p. 35.

at each step to Heereboord's *Logic*,[1] in which a "causa emanativa" is defined as that "a qua res immediate ac sine ulla actione media, emanant," and in which "non est causalitas distincta ab ejus existentia"—evidently the only sense in which such a phrase could be used by Spinoza.

It may be said, however, that the general *natura naturata* of Spinoza corresponds to the Adam Kadmon or primitive man, which, according to the Kabbala, is the first manifestation of the En-Soph. But the Adam Kadmon is one and individual, itself an emanation, and the source of all other emanations, whereas the general *natura naturata* of Spinoza consists of the modes (motion in matter, and intellect in thought) immediately and eternally depending on the divine attributes, the particular modifications of which are individual things.[2] This *natura naturata* is called in the *Tractatus brevis* the Son of God, His first effect and creature; and in the expression "filius Dei" there may indeed be a reference to Kabbalistic as well as to Neoplatonic or Christian ideas; but it is not like the Adam Kadmon set up as the macrocosm, to which the microcosm ought to assimilate.[3] In this, and in other passages,[4] it is true, Spinoza has not quite shaken off the traditional doctrine of creation; but it could not have been Kabbalistic influence that induced him to retain it, since it was the object of the Kabbala to substitute the notion of emanation in its stead.

It may indeed be the case that some of the anticipations[5] of isolated propositions in Spinoza to be found in the *Porta Cœlorum* or other such works were not without effect on his thought. But it is hard to believe that he derived much assistance from writers "at whose madness" he could "never wonder enough".[6] Their whole tone of thought is so entirely different, and their conceptions of the relation of God and the universe so widely divergent from his, that the theory of the Kabbalistic origin of Spinoza's philosophy is pronounced by Dr. Joël to be unhistorical, and has now for the most part been relinquished.[7] And as regards his doctrine of nature, we have Spinoza's own account of its source, in which he refers to

[1] Ἑρμηνεία *Logica*, I. 17, p. 114.

[2] *Tr. br.* I. 8, 9. [3] *Porta Cœlorum*, II. 1, § 9.

[4] Cf. *Tr. br.* I. 2 ed. Vloten, p. 23, ed. Sigwart, p. 15.

[5] In addition to the passages quoted by Wachter *(op. cit.*, pp. 94-5), cf. *Porta Cœlorum* II. 7 § 10 with *Eth.* I. 34 and App. Two of Wachter's quotations are also adduced by Graetz, *Gesch. d. Juden*, X. 181n.; cf. 183n.

[6] *Tract. theol.-pol.* c. 9, ed. Ginsberg, p. 116.

[7] *Creskas*, p. iv.; *Spinoza's theol.-pol. Tractat auf seine Quellen geprüft* (1870), p. xi.

the Kabbala as yielding a support more doubtful than what he claimed from Paul and all the ancient philosophers.[1]

In this account Spinoza speaks as if, in his views on God and nature, he stood alone among modern thinkers, though he might have claimed the adherence of one who but a couple of generations before had discoursed of the "*Ἓν καὶ πᾶν*"[2] which in after days attracted Lessing to Spinoza. It would be out of place here to ask whether the writings of Giordano Bruno may have come into Spinoza's hands and left their mark on his works, or to pass judgment on Professor Sigwart's careful and important investigation of the question, but the similarity of much of his philosophy to the better part of the Kabbalistic speculation and the influence which the Jewish Ibn Gebirol[3] exerted on his thought, bring his leading positions within the range of this paper.

Now Bruno and Spinoza agree with one another in a most important particular: both overcame the prevalent dualism of philosophy, and both overcame it in the same way—not by reducing one factor of the opposition to the other, but by resolving both into a higher unity. The dualism with which Bruno had to contend was that of matter and form, potentiality and actuality, corporeality and incorporeality, and he got beyond their opposition by pre-supposing a matter above the ordinary distinction of matter and form,[4] something common both to the sensible and to the intelligible world, and from which corporeal and mental substance spring as from a common root. This is his conception of Nature. "The whole is in substance one."[5]

But when Spinoza goes through a similar train of reasoning, we seem able to trace, in his different way of working, the new phase the old difficulties had received from the impress of Cartesian thought. Spinoza indeed speaks of body and mind as Bruno does of corporeal and incorporeal substance, for that is the way in which the dualism presents itself to the ordinary consciousness. But this dualism is not equivalent with him, as with Bruno, to that of matter and form, potentiality and reality; for he substitutes for body and mind the notions of extension

[1] *Epist.* 21: ". . . cum Paulo affirmo, et forte etiam cum omnibus antiquis philosophis, licet alio modo; *et auderem etiam dicere*, cum antiquis omnibus Hebraeis." Cf. *Eth.* II. 7, sch: "quod quidam Hebraeorum *quasi per nebulam* vidisse videntur".

[2] See the *De la causa*, &c., Dial. V. init., *Opere di Giordano Bruno Nolano*, I., pp. 280 ff., ed. Wagner, 1830.

[3] See especially the *De la causa*, Dial. III. and IV., *Op.* I. 251, 257, &c.

[4] *De la causa*, Dial. III., *Op.* I. 251, where Ibn Gebirol is quoted in support of the position adopted.

[5] *De la causa*, Dial. III. fin., *Op.* I. 264.

and thought, which, in Descartes, had formed the constitutive attributes of those two substances. And thus it happens that, in Bruno, corporeal and incorporeal substances still remain as substances, though only in a derived sense, being dependent on the world-reason which produces them, whereas, in Spinoza, body and mind, being reduced to the attributes extension and thought, are not dependent on the one substance in the sense of being produced by it, but constitute its essence. In Bruno, moreover, the two derived substances supplement one another as matter and form, and there is no hint of the Spinozistic doctrine of the complete parallelism but complete separation of extension and thought. The world-reason of Bruno, too, acts with design, whereas, in Spinoza, every trace of final cause is abolished with the possibility of the interaction of extension and thought. And we must not forget that at the head of Brunos's system, as in that of the Neo-platonists and of Ibn Gebirol, there stands above the world-reason a transcendent unspeakable God,[1] so that had this been the source of Spinoza's thought we might have expected a polemic against the unknowable entity, whose position in the philosophy of Bruno, though somewhat of a sinecure, is certainly an elevated one.

The impulse which drove Spinoza to seek for the unity of the unsolved dualism of Descartes may indeed have come from acquaintance with Bruno or with writings such as his. But there was much in Descartes himself to drive an independent thinker beyond Cartesianism. And however near Bruno may sometimes have come to Spinoza's positions, the style and manner of his thinking are so different from the latter's rigid logic, so much more akin to Neo-platonic and even Kabbalistic speculation, that one cannot help fearing that Spinoza would have attributed to the perfervid philosopher of Nola some share of the "insania" he found in the exponents of the Jewish Kabbala.

I am glad to be able to agree with Dr. Joël that the attempted derivation of Spinozism from the Kabbala is unhistorical, but when he himself turns to Maimonides and Gersonides, and to their acute critic Creskas, and seeks to find in them the material of Spinoza's thought, I cannot but think that he too often rests content with the discovery of superficial resemblances.

Dr. Joël compares Spinoza's idea of God with that of Maimonides, saying that the "former proves the unity of God exactly as Maimonides does".[2] But the fact is that, while Spinoza argues against compositeness of substance, Maimonides

[1] *De la causa*, Dial. II., *Op.* I. 233; cf. Dial. IV., *Op.* I. 275.

[2] *Zur Genesis der Lehre Spinoza's*, pp. 14, 19n.

attacks plurality of attributes. Both, it is true, hold that God is not in the likeness of any human personality.[1] But it is incorrect to speak of this position as if it were Spinoza's complete notion of God, for his theory has a positive side which that of Maimonides altogether wants. The former regards God as consisting of an infinity of attributes, two of which—extension and thought—are conceivable by our understanding, while, according to the latter, we can predicate nothing of God at all, lest in doing so we compromise His unity or immutability.

The theory of Maimonides is one of agnostic Deism, for he holds that God is not only separate from the world He has made,[2] but also inconceivable by the intellect of man,[3] whereas the God of Spinoza stands at the opposite pole of thought, at once identical with the universe,[4] and adequately cognised by the human mind.[5] With the former theory it is difficult to reconcile the doctrine of creation in time, but with the latter it is impossible to believe in creation at all. And had Dr. Joël[6] attended to the difference in their fundamental conceptions, he might have seen that Spinoza had not much in common here with his Jewish predecessors. For the difficulty the latter felt in the doctrine of a creation out of nothing, and the conclusion they arrived at, are quite distinct from Spinoza's position on the same question. They, regarding God as separate from the world, could not imagine how it was possible for Him to have brought into being at a definite time something that had nothing in common with Himself, and the tendency of their thought (as shown in Gersonides) was to pre-suppose a formless matter which had existed from all eternity. Spinoza, on the other hand, was so far from admitting an eternal substrate independent of God that he held there was no substantiality outside the divine essence, and thus could no longer speak of the creation of the universe, for the universe was shown to be God.

Again, we are told that Spinoza was indebted to Maimonides for his doctrine of good and evil.[7] But the similarity between the two views is by no means so great as may appear on the surface. Both, following the account of the Fall in *Genesis*, attribute to man in his perfect condition knowledge only of the true and false.[8] Both, too, regard *evil* as having merely a relative existence. But, according to Maimonides, it is a privation of

[1] Spinoza, *Eth.* I. 17, sch; Maimonides, *Moreh Nebuchim*, I. 52, tr. Buxtorf, p. 81.

[2] *Moreh*, I. 72, p. 147. [3] *Ibid.*, I. 52, &c. [4] *Eth.* I. 15.

[5] *Eth.* II. 47. [6] *Zur Genesis*, pp. 29 ff. [7] Joël, *Zur Genesis*, p. 45.

[8] *Moreh*, I. 2, p. 4; *Eth.* IV. 68.

the good or of existence (a theory common to many theologians from Augustine downwards), while, in Spinoza, *good* is equally relative with evil; the one means the useful, the other the hurtful.[1] The former theory rests on the metaphysical doctrine of the excellence of all that is, "for all existence," says Maimonides, "is good";[2] the latter founds the distinction on a psychological analysis, according to which "good and evil are nothing positive in things themselves".[3] In the one theory, evil may be called relative—*i.e.*, relative to something else that is good[4]; according to the other theory both good and evil are relative—relative, namely, to the desires of the man who calls them so. The one is an objective, the other a subjective distinction.

Maimonides and Gersonides may indeed have been in Spinoza's eye in discussing these and other questions.[5] But he is related to them as a critic, not as a follower. With Chasdai Creskas, however, he has at least one point in common—his antipathy to Aristotelianism,—and it is to that thinker especially that Dr. Joël fancies he can trace the impulses that "made Spinoza the founder of a new system *toto coelo* different from the Cartesian".[6]

Creskas is indeed quoted with approval by Spinoza[7] on account of having proved the existence of God without the assumption of the Aristotelians that an infinite regress of causes is unthinkable. He makes the remark too which Maimonides made before him, and Spinoza afterwards made,[8] that in the phrase "creation out of nothing," "nothing" is not to be regarded as the recipient of the divine creative act, but merely as the denial of anything that can be a recipient. And in another place, he uses Spinoza's example of the mathematical line to illustrate the true infinite: "as little as lines arise out of points, so little can infinite exten-

[1] *Eth.* IV. def. 1, 2; *Tr. br.*, I. 10, ed. Vloten, p. 85, ed. Sigwart, p. 55.

[2] *Moreh*, III. 10, p. 353. [3] *Eth.* IV. praef., ed. Ginsberg, p. 220.

[4] This is admitted by Dr. Joël, (*Creskas*, p. 42n), when he says that Maimonides held the "mere negativity" of evil. Maimonides also talks of evil as relative: "respective et comparative ad rem aliam" *(loc. cit.)*; but his doctrine is perhaps best expressed by his words, "mala omnia esse privationes". Creskas maintains against Maimonides that evil proceeds from God by way of trial or punishment, having good for its end—a view sharply distinguished from Spinoza's by making the good absolute or real. "From God only the good proceeds which exhibits itself to the good as reward, to the bad as punishment."—Joël's *Creskas*, p. 43.

[5] For his argument against the supposed Aristotelian position that Divine Providence extends only to genera and not to individuals (*Tr. br.* I. 6, ed. Vloten, p. 69, ed. Sigwart, p. 46), he is probably indebted to Maimonides (*Moreh*, III. 18, pp. 384-5.) Cf. Trendelenburg, *Beiträge*, III. 395 (1867), Joël, *Zur Genesis*, p. 56 (1871).

[6] Joël, *Creskas*, p. 72. [7] *Epist.* 29.

[8] *Cog. met*, II. 10, ed. Paulus, p. 126.

sion be thought of as made up of parts placed together".[1] Again when Spinoza opposes Descartes' view that God might have created things other than they are,[2] he may have been consciously working along the lines of both Maimonides and Creskas, who maintain that what contradicts reason is impossible for God,[3] though he may also be regarded as taking a side in the Scholastic controversy as to whether intellect or will is supreme in the Deity, and may have been induced to reverse Descartes' position from Cartesian works that lay ready to hand.[4]

But Dr. Joël also holds that Spinoza borrowed from Creskas some of the most important parts of his system, such as his distinction between attributes and propria in the *Tractatus brevis*, his reference of extension to the nature of God, his denial of final causes and of the freedom of the will, and his theory of the intellectual love of God as the supreme end of man. Were all this established, such positions as the impossibility of one substance creating or producing another, and the doctrine of extension and thought as the two attributes (known to us) which constitute the essence of the one substance—certainly the leading points of Spinoza's metaphysics—as well as his whole psychological and practical theory[5] would still remain to be accounted for; so that even thus no justification would be given to the extreme statements sometimes made, as if Spinoza had merely thrown a philosophy borrowed from the Jews into the logical moulds of Descartes.[6] It would certainly show, however, that

[1] Joël, *Creskas*, pp. 21-2. We may also refer to Herrera (Irira), *Porta Coelorum*, III. 1, §§ 4, ff., in which the infinite "ratione quantitatis continuæ" is shown to be inapplicable to the first cause whose infinity is that of essence and perfection, of eternity and omnipresence. Descartes too distinguishes between the indefinite and the infinite, the latter only being applicable to God.—*Princ.*, I. 27.

[2] *Resp. Sextæ* (ed. of 1663), p. 160-1. Spinoza, *Cog. met.*, II. 9, p. 121, uses Descartes' example of the angles of a triangle.

[3] Joël, *Zur Genesis*, pp. 30, 50.

[4] Cf. Heereboord, *Mel. Phil.*, III. 314a: "Consequentur Deum non posse impossibilia, et tamen plura posse quam vult. Impossibilia diximus esse quae implicant contradictionem. . . . Talia sunt omnia, quae pugnant cum proprietatibus Dei, vel essentialibus vel personalibus, aut cum natura rerum."

[5] His treatment of the emotions is admittedly founded on Descartes, but Dr. Joël asserts that the distinction of the three kinds of knowledge was anticipated by Creskas *(Zur Genesis*, pp. 62n, 64-5.) But, *e.g.*, instead of Spinoza's intuitive cognition to which enjoyment belongs and which is different in kind from belief *(Tr. br.*, I. 2, called 'ratio' in *De int. em.* and *Eth.)*, Creskas has merely belief accompanied by a feeling of joy.

[6] Cf. Ginsberg, *Eth. d. Sp.*, Einl., p. 36: "Dieser Zusammenhang" between Spinoza and the Jewish philosophers "zeigt sich als ein so unmittelbarer und enger . . . . dass die Probleme selbst durch das Studium der

Creskas played a very important part in the formation of Spinoza's thought, and furnished him not only with many of the chief problems of his philosophy, but also with the solutions of them. Whether Creskas really played that part, whether the alleged points of identity are anything more than superficial resemblances, will soon be made apparent.

In the *Tractatus brevis*, Spinoza draws an important and, for his theory, necessary distinction between the attributes of God (thought and extension), through which we cognise Him as He is, and not as working outside himself,[1] and mere 'propria' which may be ascribed to God either in relation to all His attributes (as that He is eternal, self-subsistent and infinite) or in relation to any one of His attributes (as that He is omniscient or omnipresent).[2] Dr. Joël tells us that "the same distinction" is to be found in Creskas, and quotes in support of his statement a somewhat obscure passage, in which the latter draws a distinction between what seem to be regarded as essential attributes—such as goodness or knowledge and infinite power,—and on the other hand, attributes due to mere "intellectual consideration," such as eternity denoting that God is not something that has become, or existence which denies His absence, or unity which opposes His compositeness or plurality.[3] The latter class seems to have most similarity with what were called "negative attributes" by the Jewish philosophers. But, at any rate, it cannot be identified, as Joël seeks to identify it, with Spinoza's 'propria'; for the latter include all the attributes of Creskas, and not merely a part of them, and the description of 'nominatio externa'[4] which Joël says[5] corresponds to the "intellectual consideration" of Creskas, really applies to the latter's essential as well as to his negative attributes. Creskas's distinction was an attempt to rescue certain predicates from the limbo of negation into which Maimonides had banished all the divine attributes; whereas, in Spinoza, the changed point of view which looked upon extension and thought as attributes of the one substance instead of as constituting the essence of body and mind respectively, necessarily introduced an entire change into the way of conceiving both substance and attributes. God must now be the only substance, and the attributes ordinarily ascribed to Him can no

jüdischen Philosophen des Mittelalters gegeben erscheinen und dass die Bekanntschaft mit den Schriften des Cartesius nur die Form und Anlage zu der wissenschaftlichen Darstellung gewährt."

[1] *Tr. br.*, I. 2, ed. Vloten, p. 35, ed. Sigwart, p. 24; cf. Descartes, *Princ.*, I. 56.

[2] *Tr. br.*, I. 7, n. 1, ed. Vloten, p. 73, ed. Sigwart, p. 48.

[3] *Zur Genesis*, pp. 19-20. [4] *Tr. br.*, I. 2. [5] *Zur Genesis*, p. 21.

longer be ranked as such, but must be regarded as in some sense modifications of extension and thought. Both the distinction itself and the motive for it are thus different in the two systems.

God, with Spinoza, is not different from extension as He is not different from thought. But it is in pursuance of quite another line of argument than his that a seeming ascription of extension to God is made by Creskas. "The ancients," he says,[1] "have also applied the name 'place' to the essence (form) of a thing, because it defines and limits the object both in its totality and in its parts. . . . And because God is the essence of all that exists, since He produces, defines, and limits it, therefore have the ancient doctors applied to Him the name *Makom* (place), expressing 'Praised be God' by 'Praised be Hamakom'. . . . And this is a truly beautiful comparison. For as the dimensions of the empty enter the dimensions of the bodily and its fulness, so is God in all parts of the world, is its place, for He sustains and upholds it." But Creskas never meant this as more than a comparison—a metaphorical expression for the omnipresence of God; and he holds along with it the doctrine of the creation of the world in time,[2] and "the origin of the corporeal from a form (a spiritual) in such a manner that the form bestows and brings forth something essentially unlike itself."[3] Surely Descartes himself could hardly say more than this, that the world is in essence unlike its Creator; and it is therefore somewhat strange to hear Dr. Joël asserting that it was Creskas who induced Spinoza "to give up the Cartesian thought of God having produced a substance entirely foreign to His essence".[4] Dr. Joël now[5] tells us indeed that he never meant to imply that Creskas spoke of extension as an attribute of God, and that according to that philosopher the similarity of essence between God and the world consists only in this, that "the world is good of its kind, and can therefore owe its origin to the source of the good".[6] But not only is this a similarity of essence (if it can be properly termed such) which Descartes himself would have admitted, and which cannot therefore have induced Spinoza to reject Cartesianism, but Creskas's view is also entirely outside the range of thought of Spinoza, according to whom the good does not belong to the essence of things at all—neither of God nor of the world—but only exists in the mind of man.

It is this same apparent oblivion to the radical difference between their notions of God that has led Dr. Joël to con-

[1] Joël, *Creskas*, pp. 24-5—a passage also quoted by Ginsberg in support of his theory.

[2] Joël, *Creskas*, p. 70. [3] *Ibid.*, p. 67, cf. p. 13. [4] *Ibid.*, p. 73.

[5] *Spinoza's Theol.-pol. Tractat*, p. v. [6] Joël, *Creskas*, p. 73.

found Creskas's doctrine of ends with Spinoza's denial of final causes.

Dr. Joël says that on this point Spinoza is in appearance nearer Maimonides than Creskas, though in reality he is more at one with the latter.[1] Maimonides admits the notion of ends because he believes in the origin of the world in time, and it is thus in argument rather than result that his similarity to Spinoza is to be sought. Now, there is no reason for denying that the latter may have derived assistance from the discussion in the *Moreh Nebuchim*, as well as from works nearer his own time.[2] Both Maimonides and Spinoza oppose the proposition that all things are made for man, and he to worship God. But the former attempts to refute it by dialectical arguments,[3] the latter chiefly by tracing it to its psychological origin.[4] And as Maimonides was looking for an external end of creation, Joël thinks that his views were of less importance for Spinoza's thought than those of Creskas, by whom this stand-point had been relinquished.[5]

It is certainly true that Creskas holds we cannot ask for an end of creation outside the creation itself. "God creates," he says, "because He is good, and He loves what He has created."[6] But to reject in this way external teleology is not tantamount to denying final cause. The ends of God are none the less His ends because they proceed from His very nature. "That God is good, and therefore willed to create," is Creskas's doctrine; but when Dr. Joël says that it means the same as this, which Spinoza might adopt, "That God is good, and therefore must create,"[7] exception may well be taken to the statement. For, to Spinoza, "God is good" means no more than that God in the fullest sense *is*, since moral attributes do not, strictly speaking, belong to Him; whereas moral goodness is, according to Creskas, an essential attribute of God.[8] The phrase has thus quite a different meaning for the one philosopher from what it has for the other; and for Spinoza creation has no longer any meaning whatever. He abolishes both final cause and creation, Creskas retains them both—*that* is the extent of their similarity.

[1] *Creskas*, p. 62; *Zur Genesis*, pp. 35, ff.

[2] Cf. *Eth.* I. App., p. 111: 'Et quamvis theologi, &c.,' with Heereboord, *Mel. Phil.* II. 296a.

[3] *Moreh*, III. 13, p. 364: "Absurdum maximum, quòd sc. omnia reliqua entia praeter hominem sine certo aliquo fine creata sint, cùm finis illorum, homo nempe, sine illis omnibus esse posset."

[4] *Eth.* I. App., p. 111. Nor has the argument on p. 111: "Hoc tamen adhuc addam, &c." any similarity to that of Maimonides.

[5] Joël, *Creskas*, p. 64. [6] *Ibid.*, p. 63. [7] *Ibid.*, p. 64.

[8] *Ibid.*, p. 36; *Zur Genesis*, p. 20n.

As of the theoretic doctrine of ends, so of its practical application. "The chief end of man is," according to Creskas, "the love of God without any regard to what lies outside this love"[1] —a doctrine which has been identified with the crowning point of Spinoza's system, the intellectual love to God. But the very intellectuality of this love makes Spinoza's theory essentially different from Creskas's. In the one love is constituted by knowledge, in the other cognition is but a means to the higher end of love.[2] Dr. Joël will have it indeed[3] that, in Spinoza's "amor intellectualis Dei," the "intellectualis" comes from Maimonides, and the "amor" from Creskas. But intellect *plus* love is a very different thing from intellectual love. Creskas placed the end of man in love, and held cognition to be merely a means to it; Maimonides placed it in intellect[4] to which moral qualities were strictly subordinate. And the one theory could not be adopted without rejecting the other, until Spinoza had first of all learned to identify intellect and love.

Nor, in Spinoza's system, can God return the love of man to Him as in Creskas's. The latter has a double point of view: that of man from which love is the only end, and that of God from which "the end of man is to be partaker of the good and of union with God, and consequently of the condition which makes this union lasting—the future life".[5] But for Spinoza there is only *one* point of view, and "the intellectual love of the mind to God is really a part of the infinite love wherewith God loves Himself;" and in this—not in any future life—"lies our salvation and blessedness and freedom".[6]

But one point more and we have done with Creskas. "In this treatise," says Dr. Joël, referring to the *Or Adonai*, "we have the first consistent attempt to lay the foundation of religion and morals, without the assumption that man is, in the full sense of the word, a freely-acting being—an attempt which, when made by Spinoza, excited so much wonder and opposition."[7] That Spinoza's doctrine provoked opposition is certainly true, but that it excited wonder except in the minds of the ignorant I was not aware; for since the days of the Stoics, half the schools of philosophy have accepted the theory of determinism. Creskas, it is

[1] Joël, *Creskas*, p. 61.

[2] Joël, *Creskas*, p. 60. [3] Joël, *Spinoza's Theol.-pol. Tr.*, pp. x, 46 ff.

[4] *Moreh* III. 54, where (p. 530) he quotes in support of his doctrine Jeremiah, ix. 24: "Let him that glorieth glory in this, that he understandeth and knoweth me, that I am the Lord".

[5] Joël, *Creskas*, p. 61.

[6] *Eth.* V. 36; cf. *Tr. br.* II. 24, ed. Vloten, p. 213, ed. Sigwart, p. 135.

[7] *Creskas*, p. 54.

true, departed from the traditions of his race in denying free-will, which had always been a leading point in Jewish systems. Gersonides, however, had found himself able to save it only by denying an individual providence; and Creskas, agreeing with his reasoning, was unable to avoid his conclusion without sacrificing human freedom in order to retain in their fulness divine foresight and predestination. But the theological basis on which he founds his doctrine differs from the reasons which led Spinoza to a similar result.[1] For the latter argues from the nature of volition itself, that, as existence does not belong to its essence, it must necessarily have a cause, and that in willing this or that particular thing we are moved by an external cause. Nor, he adds, can we escape this conclusion by saying that the will is the cause, since, apart from individual acts, will is a mere fiction or 'ens rationis' of which it is absurd to ask whether it is free or not.[2]

That Spinoza's view has also its theological aspect is of course self-evident.[3] But in his first attack on free-will, his arguments are founded on a psychological theory, and no attempt has been made to compare that theory with anything in Creskas. And when, on the other hand, he discusses the subject theologically, it is easy to see that he is simply carrying out the doctrine of predestination as stated by Descartes.[4] The latter had admitted that we cannot comprehend how the free-will of man can be harmonised with divine foreordination, and it was accordingly rejected by Spinoza as unable to stand the test of distinct thinking.[5]

But if the will is thus determined, how are we to defend the distribution of reward and punishment for actions which are really beyond the control of the individual? The answers of Creskas and Spinoza to this testing question are another means of showing whether their views on the will are the same or not? Dr. Joël compares the two answers as if they were identical in principle;[6] but they are really essentially different. Creskas says we might as well ask why one who comes too near the fire is burned, as why one who does wrong is punished; that is to say, the consequence is in both cases a result of the constitution

[1] This, as well as some of the previous arguments, is noticed by Sigwart in his edition of the *Tr. br.*, Proleg., p. xli. n. The difference between the determinism of Creskas and that of Spinoza is remarked on by Graetz, *Gesch. d. Juden*, VIII. 99n.

[2] *Tr. br.*, II. 16, ed. Vloten, pp. 161-7, ed. Sigwart, pp. 101-5; cf. II. 6, ed. Vloten, p. 67, ed. Sigwart, p. 45.

[3] Cf. Joël, *Spinoza's Theol.-pol. Tr.*, p. v.

[4] Cf. *Princ.*, I. 41. [5] Cf. *Ep.* 49.

[6] Joël, *Creskas*, p. 50; *Zur Genesis*, p. 60.

of things, or of the decree of God. Spinoza replies that it is as lawful to punish those who cannot subdue their passions as it is to exterminate venomous snakes, or to smother a man rabid from hydrophobia.[1] Punishment, that is, is justifiable because it is useful, because it promotes the common weal and benefits society. Creskas, following out his doctrine of the divine decree as extending to every individual occurrence, discovers in it the explanation of the consequences of actions as well as of the actions themselves; while Spinoza finds in their effects upon men not only the distinction between good and evil in conduct, but also the sufficient reason for rewarding the one and punishing the other. The whole thought of Creskas runs on different lines from that of Spinoza; the orthodox defender of Judaism has little in common with the anathematised outcast from the synagogue.

What the preceding discussion has shown in detail may now be summed up in a word. The Jewish mediæval thinkers differed from Spinoza both in the problem they had to deal with and in the solutions of it they offered. Theirs was a philosophy of reconciliation guided by the spirit of compromise; in him the movement of thought was impeded by nothing outside itself. His relation to them was as much one of antagonism as Descartes' relation to Christian Scholasticism, and indeed much more so; for Descartes remained to the last on good terms with the Church, whereas Spinoza began his career by breaking with the Synagogue. And it is scarcely possible to overlook the essential differences that separate the emanational theory of the Kabbala, the deistic conceptions of Rabbinical peripateticism, or the orthodox doctrines of Creskas, from what Solomon Maimon,[2] followed by Hegel,[3] called the acosmism of Spinoza.

W. R. Sorley.

[1] *Epist.* 25.

[2] *Lebensgeschichte*, I. 154, Berlin, 1792—quoted by Ginsberg.

[3] *Encykl.*, § 50, ed. Rosenkranz, p. 75; *Gesch. d. Phil.*, III. p. 373.

VI.—NOTES AND DISCUSSIONS.

MENTAL DEVELOPMENT IN CHILDREN.

The May number of the *Deutsche Rundschau* contains an interesting article by Prof. Preyer of Jena on "The mental development of man during the first years of life," which seems to be a continuation of studies on the early mental life of animals published in *Kosmos*. The writer, apparently in ignorance of Mr. Darwin's carefully made observations of infant mental life published in MIND VII., has gone to work in a scientific fashion, observing and comparing a number of infants.

Beginning with Movement, he maintains that the first cries of the infant are neither voluntary nor emotional, but "impulsive". The new born infant is, to use Virchow's expression, 'a spinal being,' wanting the inhibitory actions of the higher centres, and so manifesting hyperkinesis or super-abundant vivacity of movement. The Will develops not out of sense-impressions but out of instinctive impulses connected with bodily needs. Sucking is instinctive, not reflex, since it ceases when the child is satisfied. The first manifestation of Will proper is seen in the holding up of the head. The chick is unable to keep its head up for the first hour after leaving the shell, and the infant requires a fortnight for acquiring this power. The action of sitting up, which is reached in the third quarter, is like that of holding up the head, developed out of an instinctive impulse. It does not require teaching or example. The same applies to standing and walking, which are reached by a child if left quite to itself. These actions arise through the force of the will which grows with the muscles and motor nerves. Grasping movements are acquired slowly. At first the closing of the fingers on an object as a pencil, the thumb moving with the rest and not independently, is purely reflex. Not till the seventeenth week are serious attempts to grasp objects observable. The first efforts to seize a ball within reach failed: during the operation the eyes were closely fixed on the object, and a sense of wonder, the beginning of an inquiry, betrayed itself. This feeling of wonder is specially called forth by the infant's own arms and feet. For months they seem foreign to it. It gazes on them, explores them with its hands, just like other objects. In the fifth quarter it will bite its own arm so as to cry with pain. These movements only become voluntary, as they are assisted by the representation of resulting satisfaction.

With respect to the Senses, it is to be noted that the skin has little or no sensibility to pricks, &c., for one or two days after birth. According to Prof. Kussmaul's experiments, strong impressions of taste are discriminated from birth. A strong solution of sugar excites astonishment at first, all new sensations being for the moment discomposing; then it is liked and desired. This same power of discriminating strong impressions of sweet, sour, and bitter substances is shared

in by new-born animals. Taste is thus the first sense, and judgment and memory have their earliest development in this region of sensation. The case of smell is very doubtful, not lending itself to observation like taste. New-born children are all deaf. The external ear is not yet open, and there is no air in the middle ear. The first reaction to a powerful auditory stimulus took place six hours after birth in the most favourable case; often it does not occur till two or three days after. In vision too the powers of the new-born child are very low. At first the eyes move quite independently, one moving while the other is still, or one being open while the other is shut, and so on. Symmetrical movements to the right or to the left are rare in the first six days. It is said that the infant turns its head to the bright window after the first day. According to this observer, the action does not appear till the sixth day, and not till the third week does the eye turn to and fix the flame of a candle and follow it when moved. The colour-sense is deficient at first. One child prefers yellow, another red. All dislike black and excessively bright colours. The simple act of blinking when an object is brought near the eye is not acquired till the third month.

The powers of Speech are inherited though not innate. Imitation may assist, but it is not necessary. At first the vowel sounds are uttered. In the seventh week the first consonantal sound, *m*, was heard. The sounds given forth by the infant during this time are not reducible to our alphabetic symbols. In the seventh month the consonants, *m*, *b*, *d*, *n*, *r*, were clearly pronounced, and only these. Imitative sounds first occurred towards the end of the first year.

JAMES SULLY.

THE *ACHILLES AND TORTOISE:* A DIALOGUE.

Zeno. *Philophron.*

Z. If I understand you aright, Philophron, you hold that our phenomenal world, though a rough and inadequate picture of the noumenal or *thought* world, is yet a *true* one so far as it goes, corresponding to the truth, not contradicting it?

P. Precisely. Do you, Zeno, discover any contradiction between them?

Z. A most manifest one. The laws of time, space, and motion, as they *really* are, that is, are known by *thought* to be, forbid the supposition that motion, as we know it by phenomenal experience, can ever take place. Phenomenal motion involves a logical contradiction to the laws of motion as we must think them to be in reality. If therefore phenomenal motion *really* exists, it exists, not as motion, but as *rest*.

P. Show me this contradiction, Zeno, and you will go far towards making what I may perhaps call a Monist, or at any rate a Monimist, of me. For I acknowledge, with you, the unappealable character of the laws of logical thinking, in this which is their special province.

Z. Nothing is easier. See, we are now at this end of the terrace. If we continue pacing it, in one minute we shall reach the other end. Is it not so? That is phenomenal motion. Fifty yards or thereabouts in one minute.

P. Certainly. Do you mean that there is a logical contradiction in that?

Z. I do. Listen. You grant me that space, in this case the fifty yards, is infinitely divisible?

P. Granted. It is a law of thought.

Z. Well then, do you not see that, logically speaking, space being infinitely divisible, the fifty yards can never be passed over?

P. But they *are* passed over.

Z. Yes, *phenomenally* they are passed over; but logically they cannot be. That is the very contradiction which I signalise.

P. Pray explain to my obtuseness, Zeno, as clearly as you can, *why* and *how* it is, that the infinite divisibility of the fifty yards contradicts the belief that they can be passed over.

Z. It is because not one of their subdivisions can be omitted, if we are to pass over the whole fifty. But those subdivisions are infinite in number, and therefore require *an infinite time* in order to pass over them. *Logically*, therefore, we shall reach the other end of the terrace when eternity is ended,—and not till then.

P. You startle me. But tell me, Zeno, is not *time* infinitely divisible, as well as space?

Z. Certainly. It is a law of thought.

P. Is not, therefore, the *one minute*, in which we shall be (or *appear* to be) at the end of the terrace, as infinitely divisible as the fifty yards?

Z. It is so, no doubt.

P. Its subdivisions, therefore, are infinite in number?

Z. Certainly.

P. To go through the whole of them, therefore, will require an infinite time?

Z. It would seem so.

P. Is it not, then, a law of thought, on your reading, that one minute is equal to eternity, or perhaps even longer, since, to use your own words, *not till* eternity is ended will the one minute be passed through?

Z. That certainly cannot be among the laws of thought. But I admit I do not, at this moment, see how to avoid deducing it from them.

P. To me it seems quite simple.

Z. Pray how?

P. To perform the division and subdivision of any finite portion of space or of time to infinity, would as you rightly say require an infinite time, that is, a time infinitely *long*. But the divisions and subdivisions are, or rather tend to be, infinitely *short*. The longer the time employed in the division, the shorter become the subdivisions; and all the subdivisions of the one minute are together

equal to the one minute, just as all the subdivisions of the fifty yards are together equal to the fifty yards. To pass over all the subdivisions of the fifty yards requires a time equal to all the subdivisions of the one minute, neither more nor less.

Z. Do you mean that I have assumed a *minimum* of time, beyond which it is not divisible, while refusing to allow a corresponding *minimum* of space?

P. I do. You apply the doctrine of infinite divisibility to the fifty yards, and the opposite doctrine to the one minute. For only by abstracting from the divisibility *ad intra* of portions of time, that is, by assuming for the nonce their indivisibility, can you change the sense of the infinity which attaches to time, and substitute an infinity of addition (*κατὰ πρόσθεσιν*) for one of division (*κατὰ διαίρεσιν*). This you do with the one minute, thus making it into a time infinitely long, instead of a time divisible into portions infinitely decreasing. And thus it is that the tacit assumption of indivisibility enables you fallaciously to compare the infinite divisibility of the fifty yards, not with the infinite divisibility of the one minute, but with the infinitely long time requisite to *perform the operation* of an infinite subdivision.

Z. O, my prophetic soul! Now I understand the vision.

P. What do you mean by that, Zeno?

Z. One might, after devising my *Achilles and Tortoise* argument, I heard in my sleep some words, which now come back to me in all their dream-vividness, but which, not comprehending at the time, I suffered to vanish from memory: "the trick of assuming a *minimum* of time, while no *minimum* is allowed to space".[1] Other words followed, which possibly may yet revive in memory.

P. Pray what is the *Achilles and Tortoise* argument, Zeno?

Z. A race is supposed between the swiftest of men and the slowest of reptiles. Achilles moves, say, a hundred times as fast as the tortoise, and the tortoise has, say, a hundred yards start. Then I show that Achilles can never overtake the tortoise.

P. The reason being, I suppose, the same as in our present instance; the only difference being this, that, while we had to reach a fixed mark, the end of the terrace, Achilles has to overtake a moving one, the tortoise.

Z. Hold, Philophron. There is something else; and I rather suspect that the tortoise instance will not be disposed of so easily as the present one; nay, will cast a light back on it, which will again bring out the contradiction, from which you imagine you have cleared it.

P. What is the difference, Zeno?

Z. You will grant, Philophron, that, since we suppose the motion to be genuine phenomenal motion, and the tortoise has a start to begin with, Achilles must arrive at the point from which the tortoise started, *before* he can actually overtake him. I mean that, Achilles moving a hundred yards while the tortoise moves one, and the tortoise

[1] Coleridge: *The Friend*, Vol. III., p. 92 (Ed. 1837).

having a hundred yards start, Achilles after moving the first hundred yards has the tortoise still one yard in front of him. He must move over that one yard *before* he overtakes the tortoise; who will *then* be still one hundredth of a yard ahead. And this will *always* be the case, however small the fractions of a yard may become; Achilles will *always* have *some* fraction of a yard between him and the tortoise; consequently can *never* overtake him.

P. Pray, Zeno, how long do you imagine it takes Achilles to traverse a space of one yard?

Z. Possibly the hundredth of a minute, Philophron. But that is perfectly immaterial to the argument, for I do not say that the time occupied by Achilles in traversing each decreasing fraction of a yard is not infinitely short, but merely that he must traverse every such decreasing fraction *before* he overtakes the tortoise.

P. But you suppose, do you not, that the relative speed of the two remains the same; I mean that Achilles keeps on going, as he begins, a hundred times as fast as the tortoise?

Z. Certainly.

P. How long, then, does it take the tortoise to make a yard, if it takes Achilles one hundredth of a minute?

Z. It takes him one minute, I suppose.

P. Will not Achilles, then, in one hundredth of a minute from the moment where you last left him, that is, when the tortoise was one hundredth of a yard ahead, have outrun the tortoise by ninety-eight hundredths of a yard? For in one hundredth of a minute Achilles accomplishes a yard, and the tortoise one hundredth of a yard, which is in addition to the hundredth which he had to start with.

Z. Yes, Philophron, that is what takes place in *phenomenal* motion; but that is the very thing which I have shown to be *really*, that is *noumenally*, contradictory to the laws of thought. Space and time are *both* of them, as you properly insisted before, and as I admitted, divisible to infinity. Now I take my stand on this property *of them both*, and challenge you to show me how Achilles can possibly *in truth* overtake the tortoise, when both space and time are taken as infinitely divisible, which in reality they are.

P. True, Zeno, they are so; but being infinitely *divisible* is not the same thing as being infinitely *divided*. Actually to divide to infinity that hundredth part of a minute, in which (*phenomenally* as you say) Achilles overtakes the tortoise, is an infinitely long operation, just as in our terrace case. And *this* division you call upon Achilles to perform, before the tortoise can be overtaken, and to perform *phenomenally*.

Z. O, Philophron, the other dream-words come back upon me.

P. What are they, Zeno?

Z. "—— joined with that of exacting from *intelligibilia*, *νούμενα*, the conditions peculiar to objects of the senses, *φαινόμενα* or *αἰσθανόμενα*".[1]

P. Yes, Zeno. For you require that Achilles shall exhibit to the

[1] Coleridge: *ubi supra.*

senses the infinite divisibility of time and space, which appertains to them truly indeed, but only as objects of imagination and thought.

Z. Ah, I see it now, Philophron; the world of *thought* and *reality* is not a world apart, but is identical with the phenomenal world, only differently treated. Is not that what you would imply?

P. It is, Zeno. And I would add, neither is there any contradiction between them. Phenomenal motion is as infinitely divisible *in thought* as time and space are. Of that infinity it is the phenomenon, and not of *rest*, which is not its reality but its contradiction.

Z. I suspect you are right; and certainly I cannot resist your demonstration. Still I do not quite see *how* it is that you compelled me to assent to the tortoise being overtaken, the contrary to what I conceived myself to have demonstrated. Tell me, if you have no objection, by what means you effected it, where was the leverage of your argument?

P. In re-introducing the standard of measurement, which you had removed by postulating division to infinity. Relative speed can only be measured by taking either an unit of space traversed in different times, or an unit of time in which different spaces are traversed. I chose the latter, as you will remember, in comparing the spaces traversed in the hundredth of a minute. And in doing so, I was only holding you to your own statement of the problem.

Z. True. But how had I removed this standard?

P. By comparing the spaces traversed by Achilles, not with a fixed standard, but with the spaces traversed by the tortoise, which were constantly changing,— a "Lesbian rule"; and though it is true these spaces kept shortening, yet you had, in the infinite divisibility of time, a means of imagining the spaces traversed by Achilles to be shorter still, thus leaving always an infinitesimal space between him and the tortoise.

Z. Philophron, you appal me with the simplicity of the solution.

SHADWORTH H. HODGSON.

FOUR NEW PHILOSOPHICAL TERMS.

An air of pretentiousness is, I fear, not to be escaped in any attempt to justify the putting forward of new terms. Mr. Sully, however, in reviewing, in the April No. of MIND, the volume entitled *An Inquiry into the Process of Human Experience*, has made it needful for the writer of it to run the risk, if he is not to seem to admit a very grave fault charged by Mr. Sully against the book. The better plan will be to go at once to the underlying questions:—(1) whether there are or are not specifically-assignable defects in the language before used for psychological inquiry; and (2) whether the words proposed in the volume are real endeavours to remedy the defects, not being wilfully multiplied beyond the proved need, nor being made fantastic for the sake of newness.

Mr. Sully, throughout his notice, does not make the smallest,

faintest admission that there is any deficiency in psychological and philosophical terms. Yet I feel nearly sure that he does not intend to claim adequacy and finality for the phraseology now in use. This, at least, is the first issue between him and myself. I venture to affirm that some further technical words are needed in order to give full articulateness to the later scientific apprehensions of the process of human consciousness. A reader of the critique upon the volume who has not seen the book will possibly not be prepared to learn that the new terms which are put forward are just four in number. They are these :—(1) "The Executive-System" (suggested as a designation of the physical world at the last stage of philosophically considering it) ; (2) "The Neurotic-Diagram" (used as a name for the sensory-cerebral activity which is now known to happen along with each act of consciousness); (3) "Egoistic-Actualisation" (meant to enable us to speak of the occurring and subsisting of our self-cognition from time to time, that is, whenever we are conscious, in a way which avoids as much as possible language that assumes substantiality for the Ego prior to such a theory being considered and decided upon) ; (4) "The Law of Effectiveness" (a name for a working-rule seen to demarcate the bounds of human consciousness—that is, standing for the limits where our experience of self and the world is continually beginning, ceasing, and re-beginning).

These terms necessarily occur in derivative forms, as well as in the above primary spelling ; but no one who had taken the degree of trouble asked to master the significance of the words as they are first used could fail to understand the derivatives. Are these terms, or some words answering to them, needed in scientific language ? Possibly the simplest plan will be to take the phrases one by one, trying to show their applicability.

"*The Executive System.*"—The progress of modern physical science has had for its general effect the establishment of a new kind of philosophical Realism, one greatly differing from the old Realism. Scarcely a thinker of any wide repute could now be found who does not believe that, apart from man's consciousness in respect of it, there exists a world in itself and additional to man. An intellectual inference has established itself of a physical cosmos which is infinite in scale and continuous in duration—subsisting beyond man's range of sensible experience, and also enduring in the lapses of his consciousness owing to sleep, swoon, &c., or when his attention is distracted. Here there is not space to instance the proofs.

But, advancing a further and equally important step, let us add that this world so independent and real, the inference of which is made by modern science so indubitable, nearly all psychologists now agree, is not itself cognisable by us in its process, man's sensations existing only as facts of his own consciousness. The taste of sweetness, the feeling of heat, the phenomena of sound, light, &c., are held to have no subsistence without a sensorially-endowed being in the act of experiencing them. But it results from this view, strictly followed out, that the physical world, in our ultimate philosophical reference to

it, ought not to be spoken of in sensory terms without its being recognised that they do not finally apply. That is to say, a phrase is wanted, which, by the very attempt it shows to leave out all sensory description, will give habitual intellectual awareness of the fact that ultimately the physical world is not sensibly apprehended, but is only inferred.

Let us now try to ascertain what this mental inference of the not-sensibly apprehended world, for which a name is wanted, amounts to.

For this, a further fact needs bringing out clearly—namely, that although sensations, &c., only occur as events of consciousness, and are in themselves mental happenings, they can only arise or exist in a certain order of grouping or sequence—not a simple unalterable order, for its groupings and sequences are proved to be potentially transposable, but the transpositions disclose laws limiting and settling the variety of their occurring. This transposability of the order of our sensations is clearly something additional to the sensations themselves; and the apprehending of this is indeed one and the same with the inference that sensations—no matter how or whence they are actually caused—are only possible when there arrive specific occasions of them, which occasions are practically determined by an operative-process independent of the sensations. Clearly, this is virtually saying that a sensation can only happen along with the occurring of a certain event in a scheme of existence which is additional to our sensory consciousness. What that event is in itself we do not know; we have not any faculty for knowing it. The sensation, or rather grouping of sensations, which arises represents it, so to speak, and in common thinking stands for it. But modern psychology assures us that the sensation is not the cosmical event.

Owing to a specific experience connecting with our own muscular activity (which experience is named Motion), having the closest practical relation with the operative vicissitude of the cosmos—our muscular activity being in fact the ordinary means for transposing the order of the other sensations—this term Motion naturally came to be employed to designate the vicissitude itself, just as if it described the mode of it. But without going into any subtle details, it will be enough to say that it is now agreed by thinkers that the conception of Motion applied to the causative-process of the physical world is finally stultificatory. Whatever the mode of the cosmical vicissitude, it is not Motion. We have, of necessity, to make our calculations of the physical process in terms of Motion, but at the ultimate philosophical stage we have to repudiate that word as not being a real description of the mode.

How the two sets of occurrences, physical and mental, come to exhibit this practical relation, so that a sensation can only happen when the specific cosmical event is occurring, and is sure then to happen if there be right juxtaposition and activity of a human organism, is the final problem of philosophy. With that question we are not concerned here. All that it is needful to establish for the purpose in hand is, that the cosmos has events of its own, which

practically determine those of our consciousness, and that the incognisable cosmical events occur in an order that implies vicissitude, which may be called qualitative if the word quantitative does not appear rightly applicable.

The case is now fully stated. The cosmos is only intellectually inferred by us, but there is in that way disclosed an operative-process going forward, which executively determines our sensations by furnishing the possibilities or occasions of them. This is the ultimate apprehension we get of the world in philosophically considering it; and for the apprehension I ventured to think a name was asked which put off as much as possible complex sensory-associations. The term which persistently occurred to me as best serving the end was "Executive System".

It may, however, properly be asked:—Was there no language already in use which could be availed of? I think that an instinctive effort to supply the want can be traced. Let us run through the list of other terms which has accumulated. The word 'Nature' has been very commonly employed to stand for the cosmical operation; but the word Nature is pictorial—poetry claims it as well as science. It is, in fact, one of the loosest terms we have. 'Matter,' again, though it may be construed so as to be largely abstract, may mean statics, without including dynamics. 'Force' tries to obviate that difficulty, but this word is often used in respect of portions of the scheme of the world, not totalising it. The word 'Energy' is needed for a special significance of its own. By giving to the world as it is philosophically apprehended at its last, most abstract stage, the name of "Executive-System," it was sought to bring out the operative-relation which the cosmos holds to our consciousness, and to commit us to no other affirmation respecting it than this fundamental one of modern scientific Realism. Surely the bringing together of the two words "executive" and "system" does not make a very outlandish phrase?

"*The Neurotic-Diagram.*"—Physiological-psychology may claim as the most fundamental of the principles it has established, that a sensory-cerebral activity is indispensable for the occurring of consciousness as we know it. Even thinkers who hold that the Ego, while we are conscious, adds phenomena which are not assignable in any way of direct relation to the physical process, allow that the neurotic-activity must be happening in the fundamental mode which conditions the self-feeling before any such addition is practicable. But as might be looked for, none of the old phraseology—that is, none of the terms afforded by such words as ideas, notions, feelings, &c.—necessarily indicates this conditioning-operation. I have not space for particulars, but efforts have been made to get a name for the physiological activity. The term cerebration has struggled into use; and some of the more recent inquirers have sought to get a power of further specialising the process by speaking of neural tremors, grouping of nerve-units, and so on. All this has, I believe, helped. But I ventured to think that a further term was needed—one which, while

being a direct reminder of the nervous-apparatus, should distinctly allude to the fact of a specific modification of its operation being needed in and for each distinct experience. For nervous anatomy has not only made out that during consciousness there must be some cerebral activity, but has shown that answering to each act of consciousness there is a precise allotment of the neurotic-operation.

The premature classifications of phrenology have fallen into discredit; if, however, they had fully maintained themselves, the names of the "bumps" would still have needed supplementing by a word capable of naming their grouping in associated activity. At this moment, despite the striking experiments of Dr. Ferrier, scarcely any one pretends that, excepting as to the sense-organs, and a few general functions of the cerebellum and some other parts of the brain, it is possible strictly to localise the activity. But everybody agrees in an inferential conclusion to the effect that, for each individual act of consciousness there is a specific interplay of parts of the cerebral system, and that there must be habituated local allotment of the neurotic machinery in this way. Is not this the same thing as saying that in and for every individual act of experience there is *demarcation* and *configuration* of the neurotic activity? If the brain were open to observation, and we could sensibly trace its operations in all their minutiæ, we are forced to believe that we should witness an associated, related activity which would be diagramatically reproducible.

It was for the purpose of serving as a name for this physiological aspect of the process of our consciousness that I suggested the phrase "Neurotic-Diagram". It seemed to me that it recognised the fact of neural-activity being indispensable for consciousness, and at the same time kept in view that in each case there is specific configuration or demarcation of the sensory-cerebral movements. Supposing that experimental knowledge ever enabled inquirers to strictly localise functions in the nervous system, then the specific neurotic-diagrams might be designated classificatorily. That, of course, is the unhoped-for ultimate ideal limit of progress in this matter; but how could any step towards it be practicable without some such generic name as the volume proposes?

I have not space to urge in any detail the convenience of the phrase in describing the phenomena of aphasia, epilepsy, &c.; nor how it throws light upon the use of hypothesis in reasoning, and on the distinction between Memory and Imagination, on the shortening of chains of ideas, &c. My own experience forces me to believe that the use of the term would brush away much mistiness from the prevailing psychology, which is continually forgetting its physiology. Is the phrase a very hard one? Do "neurotic" and "diagram," both plainly understood words when they stand apart, suddenly grow unintelligible on being brought near?

"*Egoistic-Actualisation*" and "*The Law of Effectiveness.*"—I couple the third and fourth of the terms, for the explanation of the one runs into the other. In the brief construing, earlier given, of the phrase "Egoistic-Actualisation," it was claimed for it that it enabled

us to speak of our self-awareness phenomenally, without assuming in the very words we start with substantiality of the Ego. If a thinker refuses to grant entity to the Ego, he still has to allow that something which practically amounts to egoistic-actualisation happens whenever consciousness begins or resumes. Well, is there or is there not an advantage in a term which strictly defines what must be conceded by everybody in this first stage of describing what happens mentally?

But, as I previously said, this term practically connects itself with the use of the fourth and last of the names proposed, *viz.*, "The Law of Effectiveness". In reference to it, I beg leave to posit two facts:—First, that our self-consciousness intermits from time to time, *viz.*, in sleep, during miscarriages of attention, &c. Secondly, that all the sensations, one or more of which must be in the act of going forward whenever we are aware of ourself and the world, only arise and only last while the conditioning-operation of the world (*i.e.*, the Executive-System) observes a specific range of what we call rate, volume, direction, &c. I suppose that both these statements will be admitted by everybody. Now, the practical observance in our experience of these limitations is probably describable as the working of a Law; that is, the executive-operation for the conditioning of human consciousness is found to be effective only within such-and-such a range of its vicissitude. But is there at present any distinct and compendious recognition of that fact in a verbal expression, which will keep prominent in our thinking this practical limitation of our consciousness by the term recurring continually in the expository phraseology? I did not know of any.

In the absence of a periodical use of some such qualifying term, not a little language to be met with in the works of eminent psychologists confuses the true state of the case. We hear of the mental and physical sides of a fact, as if consciousness and the universe were, so to put it, conterminous. In truth, only a few of the cosmical events can rightly be spoken of in that way. We hear, in a general unrestrictive way, of consciousness being a function of the organism, as if all the activities of the organism rendered phenomena of sentiency in our experience. On the contrary, nothing has been more decisively proved by modern science than the fact that it is perfectly easy by either heightening or lowering, widening or narrowing, the physical operations—named "impressions" in the old terminology—to nullify their power of challenging the Ego and of furnishing sensations. Only a limited range out of the total possibilities of intra-bodily executive-operation has the power of conditioning human experience. By the use of the term "Law of Effectiveness" in connexion with the other related phrase "Egoistic-Actualisation," the true state of the case is recognised. If the phraseology starts a further inquiry, namely, as to the sanction enforcing these limitations, that problem has to be accepted like any other. It is advisable that we should know exactly where we stand, and if a problem is naturally suggested which has finally to be pronounced

insoluble, still the fact of the suggestion of the problem is valid in itself and is part of the situation in which we find ourselves.

I have reached the end of the proposed innovations in phraseology, and in doing so have fully exhausted the space I can expect from the Editor. I will only ask—Were these four terms needed? Are they very formidable? Do they bear marks of any wish to coin new verbiage for novelty's sake? I must leave the answers to the reader. I am not complaining that the terms must of necessity fight their own way. It is on the whole well that some penalty should attach to any meddling with language; and I foresaw that I was incurring the disadvantage, but felt compelled, for what seemed to me good reasons, to submit to it. The future will show what degree of versatility in this respect there is among the class of readers to which the volume addresses itself.

I should not like to conclude without mentioning that I have in another way thanked Mr. Sully for the generous appreciation of his review in respect of the points which he found himself able to approve.

WILLIAM CYPLES.

THE ETHICAL METHOD OF EVOLUTION.

IT may be of some service to students of Ethics to have stated in a concise way the principal questions discussed in the *Data of Ethics*, so far as there seems to be originality in the discussion, and further, in the same connexion, to have presented the assumptions that evolutionists must make before they can establish a new method of Ethics. We propose here to review briefly Mr. Spencer's criticism of other views, with the object of arriving at an estimate of the value of his proposed alterations.

I. (1) Mr. Spencer asserts—"There continues to be entire satisfaction with that form of utilitarianism in which the causal relations between acts and their results are practically ignored" (p. 58); and he goes on to say that utilitarians make no use of deduction in their method. With this position it is only necessary to compare the sixth book of Mill's *Logic*, *passim*. We select one or two sentences out of a hundred that would answer the purpose. As to the formation of character, 'The empirical law derives whatever truth it has from the causal laws of which it is the consequence'. 'Now to such cases we have seen that the Deductive Method, setting out from general laws, and verifying their consequences by specific experience, is alone applicable.' The very illustration used by Mr. Spencer in regard to "the course of one who studies pathology without previous study of physiology" as resembling the usual course of moralists, is one used by Mill for precisely the same purpose:—'Students in politics thus attempted to study the pathology and therapeutics of the social body, before they had laid the necessary foundation in its physiology' (*Logic*, B. VI., c. vi., § 1). In fact Mr. Spencer's volume is very curious reading, taken in connexion with the sixth book of the *Logic*.

(2) Mr. Spencer rather cautiously opposes Mr. Sidgwick in regard to the "fundamental assumption of Hedonism," that feelings as feelings can be arranged in a scale of desirability. He gives two reasons for his opposition; first, although "indefinite things do not admit of definite measurements, yet approximately true estimates of their relative values may be made when they differ considerably" (p. 152). Elsewhere we find the statements—"The philosophical moralist is obliged wholly to ignore any deviation from strict rectitude. It cannot be admitted into his premisses without vitiating all his conclusions" (p. 272). Mr. Spencer adduces the analogy of geometry to show that Ethics ought to deal with ideally perfect human relations, and rebukes Mr. Sidgwick severely for maintaining that geometry can deal with irregular lines. It appears that Mr. Sidgwick's offence consists in not introducing the word 'approximately'. Since all lines known to our senses are irregular, it seems not improper to consider that geometry in some sense does not refuse to deal with them.

The second reason given by Mr. Spencer is as follows:—"Even if the relative values of things are not determinable, it remains true that the most valuable should be chosen." "Because I believe that of many dangerous courses I ought to take the least dangerous, do I make 'the fundamental assumption' that courses can be arranged according to a scale of dangerousness" (p. 153). It is enough to say that the word 'dangerous' has no meaning, unless it is possible to compare objects or acts with reference to this quality. Mr. Spencer's own illustrations of the relativity of knowledge make it plain that we could not know that a course was dangerous at all, unless we could measure it against other courses. It is difficult to comprehend how the maxim 'Take the least dangerous course' is supposed to have originated, when no difference between courses in respect to danger could be discerned.

The motive of Mr. Spencer's opposition is his desire to introduce Justice as a principle from which right action may be deduced without calculation of pleasures. But he has himself shown that justice is only a means to happiness (c. iii.), and it is impossible to do this without an acquaintance with the consequences to happiness of just acts. Of course, if Mr. Spencer insists that a just act is one that *must* produce happiness, and refuses any inductive proof, the question becomes merely one of definition, and controversy is profitless.

(3) It is somewhat perplexing after this apparent denial of any direct comparison of pleasurable results, to listen to Mr. Spencer's comments on the 'hedonistic paradox'. He thinks this no paradox, because it is a general law that the pleasure attendant on the use of means to achieve an end, itself becomes an end. No one, perhaps, ever disputed this, but since the paradox holds of pleasures connected with the use of means, the explanation misses the mark. If such pleasures are made the conscious aim, the highest zest and flavour are gone from the pursuit. Probably nowhere is the failure more signal than in the case cited by Mr. Spencer, where the admiration of others causes the pleasure. He seems himself paradoxical when he maintains

that happiness cannot be reached by making it the immediate object of pursuit, and at the same time insists that the pleasure of using means itself becomes an end. This latter pleasure is happiness;—if happiness cannot be reached by direct aim, the happiness derived from the use of means cannot be gained by aiming at it.

Mr. Spencer, in criticising Bentham, remarks that what pleasure is, is an extremely uncertain question. As his theory is based on the principle that pleasure is intimately connected with welfare, it seems to follow that if we cannot tell what pleasure is, we cannot tell what welfare is. If we had any means of determining welfare without reference to pleasure, we might dismiss happiness altogether as an end. But as Hobbes's principle, Pleasure helpeth vital actions, is fundamental to evolution, this way of escape is cut off.

(4) Mr. Spencer's ideas concerning Justice deserve a little examination. It "is concerned exclusively with *quantity* under *stated conditions*, whereas happiness is concerned with both *quantity* and *quality* under *conditions not stated*". It refers to "the relative amounts of actions, or products, or benefits, the natures of which are recognised only so far as is needful for saying whether *as much* has been given, or done, or allowed, by each concerned, as was implied by tacit or overt understanding, to be an equivalent". Overlooking the objection that justice is here confined to the market-place, it is to be observed that it is not a simple matter to determine that one act, or one part of a course of action is equivalent to another. It is impossible, as a rule, to specify all the circumstances that may affect future acts. It is impossible that the understanding of all persons interested in a certain transaction should be the same. Some expectations must always be disappointed, and in such cases the consideration of happiness generally controls the decision. "Differences of age, of growth, of constitutional need, differences of activity and consequent expenditure, differences of desires and tastes," which Mr. Spencer thinks impossible to be estimated by a utilitarian, must all be estimated before any course of action can be said to be *equivalent* to any other course. And if a comparison of pleasures is impossible, this estimate is impossible.

But it cannot be admitted that justice consists simply in the fulfilment of contracts. Very few persons in the lowest ranks of labour, perhaps, regard their wages as an equivalent for their pains. It is all they can get and they take it, but to say that justice is confined to giving them it, is to say that the existing social arrangements are perfectly just, which Mr. Spencer does not maintain. If he is talking of justice in an ideal state, he still has to suppose every person in making a contract to be able to decide what will be an equivalent for his sacrifice and to do this without a comparison of pleasures.

(5) In attempting to expound Absolute Ethics Mr. Spencer seems to be inconsistent with himself. We are told that "the moral law is the law of the perfect man—the formula of ideal conduct—is the statement in all cases of that which should be, and cannot recognise in its propositions any elements implying existence of that which should not be. . . . No conclusions can lay claim to absolute truth, but such as

depend upon truths that are themselves absolute, &c." (p. 271). At the close of the treatise we are informed that "a code of perfect personal conduct can never be made definite. No specific statement of the activities universally required for personal wellbeing is possible." If a code of perfect personal conduct can never be made definite, it can hardly be called absolute. And if personal conduct cannot be defined, race conduct or national conduct cannot be defined. The least objectionable compromises of the claims of an indefinite Absolute Ethics with those of a defective and empirical Relative Ethics, with no standard of objectionableness to appeal to, is all that we have to guide us in weighing the claims of present self against the claims of future self, and our own interests against those of others.

(6) In criticising the expression, 'Every one to count for one, &c.,' Mr. Spencer asks—"Does this mean that, in respect of whatever is portioned out, each is to have the same share, whatever his character, whatever his conduct?" The answer to this question may be found by Mr. Spencer in the quotation that he himself makes from Mill. 'The Greatest Happiness Principle is a mere form of words without rational signification, unless one person's happiness, supposed equal in degree (with the proper allowance made for kind), is counted for exactly as much as another's.' Mr. Spencer goes on to maintain that it would be absurd to divide equally "the concrete means to happiness" *(quantity* under *stated conditions)*, because "differences of age, of growth, of constitutional need, differences of activity, &c.," would prevent the greatest happiness from being even proximately secured (p. 223). It is "the conditions under which each may pursue happiness" *(quantity* and *quality* under *conditions not stated)*, that are to be equally distributed. It will hardly be thought that such a distribution, which must take into account all the peculiarities of individual character and the possible effects of outside forces, is a simpler task than that of comparing pleasures.

After ridiculing all the attempts of others to attain equality in the distribution of happiness, on account of individual differences, Mr. Spencer proceeds to state that in the case of his theory it will be convenient to disregard this objection. "Though . . . we cannot regard the members of a society as absolutely equal, and therefore cannot deal with problems growing out of their relations with that precision which absolute equality might make possible; yet considering them as approximately equal in virtue of their common human nature, and dealing with questions of equity on this supposition, we may reach conclusions of a sufficiently-definite kind" (p. 285). The objections to equalising the treatment of good and bad seem to have now disappeared. The "differences of age, &c.," that formed an insuperable obstacle to the utilitarian, may be waived by the evolutionist. Mr. Spencer seems to overlook the fact that if he can get sufficiently-definite conclusions by assuming the approximate equality of all men, his adversaries will claim the right to make the same assumption, and get equally definite conclusions; while critics will deny the right to both, upon the ground that it is precisely because

men are not, even approximately, equal, that Ethics is a difficult field of study.

II. We now proceed to consider the assumptions necessary to Mr. Spencer's conclusions. The essence of his theory may be stated in a few words. We are now to employ the deductive method in morals. The immediate object of pursuit should now be conformity to certain principles which, in the nature of things, causally determine welfare. Hence welfare and the principles that determine it must be defined. Conduct is good or bad according as its aggregate results are pleasurable or painful; and good conduct is highly evolved conduct. Conduct is most highly evolved and therefore best, when the making of all adjustments of acts to ends subserving complete individual life, together with all those subserving maintenance of offspring and preparation of them for maturity, not only consists with the making of like adjustments by others but furthers it. The complete life is the life that is the greatest possible both in length and breadth. Length of life perhaps requires no definition; breadth of life varies as the sum of vital activities, or with the number and variety of adjustments of acts to ends. Hence we may suppose that life to be the broadest wherein the number of adjustments, allowing for variety, is the greatest possible.

(1) The first assumption that we will consider is this. *The proportion which variety, in the adjustment of acts to ends, bears to number, is knowable.* Unless we can say whether one life containing a greater number but a less variety of adjustments is more or less broad than another, we cannot tell what breadth of life is. And if not, we cannot define complete life, for life is estimated by multiplying its length into its breadth. If we cannot tell what complete life is, we cannot tell what conduct is most highly evolved or best. The only attempt to remove this difficulty has been already alluded to. If we consider the members of a society as approximately equal, of course we need not trouble ourselves about the breadth of their lives. In regard to the knowableness of length of life, the same assumption is made, and the same criticism will apply.

(2) Supposing that we are able to reduce quality of adjustment to terms of number, it is then necessary to assume that *the greatest possible number of adjustments is a knowable quantity.* We must know the final number of possible complete lives upon the earth, so as to regulate our acts with reference to the production and maintenance of this number. Any miscalculation will result in a diminution of positive happiness or an increase of positive misery. Without this knowledge, we cannot say of any act that it is best.

(3) *The proportion between acts that subserve complete individual life and those that subserve maintenance of offspring is knowable, as well as the relation of this proportion to all similar proportions.* Most of the problems of life require, for their perfect solution, this knowledge. Mr. Spencer's system must suppose that there is no uncertainty about the numerical relations of a single proportion, if it is to be absolute in character.

(4) Absolute welfare being thus established, it is found to be a state where the adjustment of acts to ends results in the adjustment of acts to ends. To connect welfare with happiness the doctrine of the relation of pleasure to welfare is introduced. Mr. Spencer defines pleasure as whatever feeling we desire. This, as Mr. Sidgwick observes, is not a psychological truth, but a tautological assertion. Even if we consider pleasure as agreeable sensation, and admit that all our activity is directed to the attainment of this end, which is certainly more than would commonly be assumed, several additional assumptions are necessary before the doctrine is of service to Mr. Spencer.

(5) It cannot be denied that the choice of a present pleasure instead of a present pain often results in death or diminution of life. But, it is urged, this merely shows "that special and proximate pleasures and pains must be disregarded out of consideration for remote and diffused pleasures and pains" (p. 85). Mr. Spencer's doctrine seems a curious blending of the Aristotelian mean and the Socratic view that virtue is knowledge. But he has elsewhere committed himself against the fundamental assumption that pleasures are measurable, and what guidance we are to have in disregarding special pleasures is not clear.

(6) As the conditions of existence have changed in the past, misadjustments of feelings to the requirements have arisen, and failures of guidance by pleasures and pains. "But lack of faith in such further evolution of humanity as shall harmonise its nature with its conditions, adds but another to the countless illustrations of inadequate consciousness of causation." "Progress cannot cease till complete adaptation is reached." We will not stop to compare this view with that of the Millenarians, and will only suggest that even death is only necessary on the assumption of an arbitrarily fixed vital force that is gradually expended. The assumptions here made are, first,—*Happiness has gradually increased.* This would be denied by an increasing school of pessimists. Secondly,—*The conditions of existence which have hitherto been occasionally changing, will become fixed.* If not, misadjustments and failure of guidance will continue. This assumption requires a host of others as to the infinity of the universe down to the permanence of the supply of coal. Thirdly,—*What the ultimate conditions of existence will be, and when they will be established, is knowable.* Without this knowledge we cannot correct misadjustments, nor distinguish the true value of remote pleasures. And an error of a million years in his calculation might transform a paragon of virtue into a monster of vice. Fourthly,—*The conditions of existence that will intervene between the present and the ultimate conditions are knowable.* Natures adapted to one set of conditions must be gradually adapted to changing conditions and these latter must of course be known.

(7) At the beginning of his treatise Mr. Spencer declares that no part of conduct can be understood unless we understand the whole, not only of human but also of animal conduct, and not only all present but all past conduct. Such being the condition, we welcome some of the criticisms that occur elsewhere in his treatise. "The few factors

in this immense aggregate of appliances and processes which are known, are very imperfectly known, and the great mass of them are unknown." "Throughout a considerable part of conduct, no guiding principle, no method of estimation, enables us to say whether a proposed course is even relatively right."

(8) It would be now in place to consider the principles that causally determine welfare. We have been able to discover but one principle that is not too vague and general to be useless,—the principle of Equity or Justice. But since this principle is fruitful only on the supposition of the equality of the members of a society, it perhaps requires no especial consideration. As to the general value of this system of Ethics, we cannot suppose that Mr. Spencer will be contented with the position of a medical adviser assigned him by Prof. Bain in his review in MIND. The system has the strength and the weakness of other systems that assume a knowledge of final causes. Grant to any one the gift of the seer and the elaboration of a system is not difficult. But no such system is favourable to freedom, for it involves the belief in a part of mankind, that the freedom of the rest can lead only to their misery. The only ground of freedom is in the uncertainty of the future. Remove that, and the lives of all men ought to be marked out for them, and any divergence from what is known to be for the general good must be punished. This is the doctrine of the Roman Church. It is also a doctrine to be learned from the *Data of Ethics*.

D. M'G. MEANS.

BRUTE REASON.

Is the obscurity in which this subject still remains involved really owing to any impenetrable abstruseness of the subject itself, or is it due, even partially, to any mistake in the usual mode of treating it? To many persons the question may seem bold; to some, even frivolous. Mr. Darwin tells us, probably with much truth, that "few persons any longer doubt that animals possess some power of reasoning". Yet, notwithstanding this growing unanimity, one looks in vain amongst the writings of those who favour the notion of brute reason for any defence of it which does not involve the violation of fundamental principles of logic, or of philosophy, or of both. Take a few of the writers of the present century. First, as to *instinct*. Lord Brougham (*Dialogues on Instinct*) held instinct to be the "constant, immediate, and direct operation of the Deity," a conceit the authorship of which he attributed, somewhat gratuitously, to Sir Isaac Newton. Mr. Herbert Spencer defines instinct as "compound reflex action"; while many persons, of various degrees of culture, vaguely imagine it to be an intelligent endowment, or innate intelligence, which they expressively denominate "instinctive knowledge".[1] It is clear that in each of

[1] See an article on "Instinct," by D. A. Spalding, in *Macmillan's Magazine*, No. 160.

these cases the subject of the proposition is instinct itself, which is necessarily unknowable, rather than its phenomena and attributes, which are more or less discernible by us. Then as to *reason*. Hume had affirmed earlier that "no truth" appeared to him "more evident than that the beasts are endowed with thought and reason as well as men". Mr. Darwin (*Descent of Man*) says that "animals may constantly be *seen* to pause, deliberate, and resolve;" and Brougham formally states both the question itself and what he conceived to be the proper mode of dealing with it in the following terms:—

"I think there can be no doubt here. We must examine it in accordance with the rules of inductive science. The facts are before us. Some we gather from observation—those relating to the animals; some, as those respecting the nature of the human mind, we ascertain by our own consciousness, or at least chiefly by that, though in some sort also by observing other men's conduct, and communicating with them; but having no means of communicating with the animals, we are reduced to our observation merely, and then we naturally draw the inference that, because the same things done by ourselves would be known by us to be done from certain mental powers, therefore we ascribe those powers to the animals."

I have written Brougham's statement at length because it equally well expresses the general position of believers in brute reason in our day as in his. Taken collectively, these quotations show a startling amount of questionable logic, questionable philosophy, and general confusion of ideas.

(1) The nature of instinct is confounded with its attributes and phenomena—*e.g.*, by Brougham, Spencer, and believers in "instinctive knowledge".

(2) The inferences and conjectures of the writers are confounded with the facts from which they are drawn—*e.g.*, by Hume and Darwin. The practically logical character of much of the conduct of animals is surely all that may be "seen" by us, or that can in any sense be said to be "evident"; and is the *fact* from which deliberation, resolve, or reason on the part of the animals is *inferred*. Intellectual processes can neither be "seen" by nor be "evident" to observers.

(3) The "rules of inductive science" are uniformly and persistently violated by arbitrary selections of facts apparently favouring the writers' views, without due regard to the phenomena as a whole and their collective significance. The notion of brute reason is founded upon the external resemblance of part of the conduct of animals to the known rational conduct of man. It ignores, however, the fact of a vast body of phenomena in the conduct of the animals themselves — namely, those actions known as "purely instinctive," as well as in the motions of plants and chemical substances—phenomena identical in point of outward logical character with those selected, except that they occur under conditions which are considered to preclude any possibility of rationality. The induction, therefore, is doubly imperfect, and the conclusion a *petitio principii*.

(4) Abstract questions are confounded with questions of observa-

tion and experiment. It seems but a truism to affirm that this question, in so far as it is one of intellectual powers and operations, is no less purely and simply a question in mental science than any concerning the intellectual powers and states of man. Hence the naturalist's claim to authority here is as untenable as would be that of the chemist in pathology.

Now, the due observance of the several practical principles thus overlooked in their application to this question—principles which lie at the foundation of all philosophising—would compel us to recognise this important fact, namely, that the *nature* of instinct being absolutely unknowable, it follows—(1) that the scope of its operation is *à priori* unknowable; hence (2) that rationality cannot be predicated of animals until, *(a)* that scope is ascertained, and *(b)* the rationality itself is proved, which (3) cannot be done by observation or experiment. The simple recognition of this fact would at once clear the ground of a number of misconceptions which have tended to obscure the subject, and we may at once premise the following general position, namely—

That the question of brute reason necessarily involves, and forms one with, that of the scope of instinctive operation; that it is a general question, a question in deductive philosophy, and can only be determined, if at all, by reference to certain general facts and principles.

Instinct is commonly supposed to be restricted in its operation to certain general routines peculiar to each species under normal conditions—to action only in certain lines fixed in the constitution of the animals determined by their necessities in a state of nature, so that in any animal placed in other than its ordinary and natural circumstances the operation of instinct is suspended. But nature, it is further supposed, anticipating such a contingency, has endowed the animal with the power of reasoning by which to guide itself in the new condition of things. Manifestly if there be any such limitations, reason, or something practically equivalent to it, must be as necessary a condition of existence with animals as with men, since without it they would in abnormal or unusual circumstances be wholly destitute of guidance; while if there be no such limitations there can be neither need nor room for reason, since instinct rules the whole domain of voluntary activity.

It may also be at once conceded that if one single action of any individual animal could be shown beyond question to have resulted from reasoning on the part of the animal, the rationality of that animal would be thereby established, and such individual would stand good for the entire race. There would then be no need to multiply examples. One unequivocal instance of reasoning would be as good as ten thousand, and one individual rational animal as good for determining the question as the entire brute creation. The chasm between man and the brute would then have been bridged; the controversy would be at an end.

Has any such unequivocal instance of brute reason ever been known? No one can seriously affirm that it has. Many persons

have, of course, believed certain actions to be rational, but no one can point to any one of them and say, 'That was the outcome of reasoning on the part of the animal'. The semblance may be very striking, but the identity is, so far, involved in doubt. Clearly, to multiply such examples is useless. If we cannot be sure as to any one of them, neither can we as to any number of them. A myriad of such examples are but so many illustrations of the same unanswered question, and were every animal in existence to furnish innumerable instances of the kind, the question would be no nearer solution. That question is not, whether the conduct of animals in any instance *appears* to be rational? All are agreed on that point. The real and only question at issue is, *whether the appearance is true or illusory?* This cannot be determined by observation of particular actions of individual animals. It is a general question, and if dealt with phenomenally at all, the phenomena must be taken as a whole—not merely from the world of animal life, even, but from every department of nature. Yet when treated thus strictly "in accordance with the rules of inductive science," the question would be but little the forwarder, while the balance of evidence would not be found to favour the notion of brute reason. A fowler spreads his net to catch birds, a fisherman fish, a spider flies, and each constructs his net, and places it in such advantage of locality and position as may best conduce to that object. No one doubts that the conduct of the spider is instinctive, or that of the fowler and fisherman, generally speaking, rational. Yet, so far, the "rules of inductive science" would clearly require us to refer the conduct in either case to the same "mental powers," and to conclude either that all are rational or all instinctive, for *prima facie* there is no difference between them. But it is obvious that to stop here, to argue the rationality of the spider from the known rationality of the fowler and fisherman, while ignoring similar phenomena exhibited under other conditions, would be, "not in accordance with," but in direct violation of, the "rules". The practically logical character of the actions being the real and only point of the induction, the "facts before us" must comprise *all actions in nature exhibiting that quality.* Hence the motions of plants and of chemical and elementary substances must come under that class, since they exhibit that quality in a high degree. When the roots of a tree growing near a ditch, instead of continuing in the direction of the ditch, shun exposure by descending even into unfriendly soil, and passing underneath the ditch, ascend to their proper soil on the other side; or when a vine, avoiding low vegetables and other obstructions, passes on to a more distant pole, and climbs it; when elementary substances exercise their mutual affinities and antipathies, faithful in both to the mysterious law of combining proportion, or crystals assume their respective geometric forms in obedience to a law no less mysterious, they practically discriminate between the useful and the useless, between safety and danger, order and confusion, beauty and deformity, and in choosing the one and avoiding the other, employ means to ends. These phenomena are in no way explained by reference to any

known physical forces, any more than the like phenomena in animals; and, therefore, in any strictly inductive inquiry into this question they must, like them, be included within the category of the "facts before us". The affirmation concerning the conduct of animals that "the same things done by ourselves," *i.e.*, actions of discrimination, design, and purpose, "would be known by us to be done from certain mental [rational] powers," applies with equal force here; and the only conclusion, if any, that can be legitimately drawn from the facts as a whole is that, as we are precluded by the nature of things from ascribing the conduct of plants and chemical elements to reason in the agents, neither may we that of the animals, our ignorance of its real causes being the same in either case. So far, then, our general position seems not unwarranted. The question must be determined, if at all, by reference to general facts and principles. Let us, therefore, inquire whether such limitations and distinctive conditions as are commonly ascribed to instinctive operation are *compatible* with the existence and exercise of reason in the same individual animal?

Brougham and others restrict the operations of instinct to "*ordinary and natural circumstances*," and distinguish them from "rational" actions by their being performed "*without knowledge or design*," "*without instruction, experience, or knowledge of consequences*," &c. We have already observed that the reason-hypothesis *implies* some such restrictions. There is much ambiguity about these phrases, but construing "ordinary and natural" as liberally as we may, as comprehending, say, any circumstances to which an animal may have been accustomed by habit or early familiarity, it follows, even then, that the conduct of a large proportion of the animal world must be less instinctive than rational. Animals tamed, domesticated, or confined after living wild or free, can have but few, if any, opportunities for the exercise of instinct. Even animals still wild, whose general condition of life must be, if any be, considered "natural," find themselves very frequently in circumstances quite new to them, and calling for new lines of action; in all which cases the operation of instinct is, according to this rule, suspended. Suppose such instances to become more frequent —then, reason being the alternative, those animals become, in the same proportion, rational, and even reasoning beings; and by the same rule, if placed in circumstances altogether abnormal or unusual, they would thereupon become wholly rational and always reasoning. Apply this to all the animal races, and by a mere mechanical change of outward circumstances, accidental or otherwise, instinct would cease to exist amongst animals, and reason alone would rule their entire conduct.

Still less tenable seems the twofold assumption which connects these limitations of "ordinary and natural circumstances" with the *distinctive qualities* of instinct referred to in any individual possessing the power of reasoning. Almost any of the examples of supposed animal reasoning adduced in contradistinction from those of instinctive action will serve to make this more or less manifest. Huber's well known experiment of inserting a piece of glass in a hive across the line in which the bees were building, affords

a good one, from the sharp contrast which it is supposed to present to, as well as its close practical connexion with, their "purely instinctive" operations. Bees ordinarily lay the foundations of their combs in an approximately straight line (though the combs themselves often become warped during construction, owing, probably, to variations in the temperature). Both Brougham and Spence[1] adduce the conduct of the bees in this case as an instance of reasoning. Upon the obtrusion of the glass, on which it would have been unsafe to build, the bees, instead of continuing their work in a straight line, as heretofore, changed its direction just before reaching the glass, laying the remaining portion of the foundation at right angles with the former, and so at once avoided the glass and saved their previous labour. This, these writers and others imagined, could only have resulted from reasoning. Up to the point of the obstruction, or thereabouts, it is said, the bees acted instinctively, but the alteration of the work and its adaptation to a circumstance so unusual could only have been effected by deliberation and design—in short, reasoning.

Whatever of feasibility may seem, upon a superficial view, to attach to this conclusion disappears the moment we begin to examine it. In turning the comb the bees, we are told, acted rationally; they both *knew* and *intended* what they were doing. But what does this mean? *What* did they know and intend? Till then they were building a comb, as usual, in a straight line, full of hexagonal cells, with rhomboidal bottoms. Did they know they were building such a a comb? According to these writers they did *not;* they were acting instinctively, and therefore "without knowledge or design;" they only knew they were "putting particles of wax in a place" (Brougham); they knew neither why nor precisely where; the shape and construction of the comb were entirely the result of "blind instinct"; they knew nothing of the comb as such, and nothing whatever of any plan of construction. The glass, however, being obtruded across the line of their progress, it became necessary either to build upon the glass, or abandon the work, or change its direction. The bees adopted the last of these alternatives. Here, however, they not only designed a new plan; they also executed the design, performing the whole variation with the same consummate skill that characterised their work performed on the original plan. Now, granting that bees ordinarily build "without knowledge or design," how, on the reason-hypothesis, does the case stand with regard to this variation?

It is admitted that till now the bees knew nothing of hexagons and rhomboids, and, therefore, nothing of their geometrical significance. All at once, then, upon the very first glimmer of intelligence, they must have perceived, for the first time, not merely the comb, but also its various purposes and relations; not merely the wax, but the necessity for the utmost economy in its use as the building material. They must have ascertained, "without instruction or experience," what

[1] See the chapter on "Instincts of Insects" in Kirby and Spence's *Introduction to Entomology.*

no human intelligence could ascertain without considerable mathematical instruction and experience, namely, the precise form in which to construct the cells of the comb, so as to secure a maximum of strength and storing capacity in the structure, with a minimum of space and material; and, therefore, have informed themselves of the full significance and geometrical value of hexagonal cells with rhomboidal bottoms, an achievement which, to human reason, could have been possible only by dint of a complex series of abstruse mathematical computations. Further, they must have perceived the risk they would entail upon the entire structure by laying the foundation, or any part of it, upon the glass instead of upon the woodwork of the hive, and therefore have acquainted themselves, still "without instruction or experience," with the differing properties of the wood, the wax, and the glass. These perceived, together with the necessity for turning the comb to avoid the glass, they must then have ascertained the necessary gradations and modifications in the sizes of all the cells in the vicinity of the glass for effecting the proper angle in the comb upon the same economical principle; which could only have been accomplished by another series of still more complex calculations. Even this comprises but a few of the facts which their intelligence must have grasped, and but a portion of the work which they had to achieve. Yet, upon the reason-hypothesis, they both grasped the facts and accomplished the work; for they "shortened the lengths of the cells; diminished their diameter; gradually made them pass through a transition from one state to another, as if they were making the instinctive process subservient to the rational; and, in fine, adapted their building to the novel circumstances imposed upon them, making it in relation to these what it would have been in relation to the original circumstances if they had continued unaltered". Thus they had to arrive, by regular logical processes, necessarily very complicated and involved, at conclusions, the several premisses of which they not only were wholly ignorant of, but had no means whatever of acquainting themselves with. Brougham's language, therefore, in describing their "*purely instinctive*" actions, is exactly descriptive of their conduct in this case:—"We perceive certain things done by these insects without instruction which we could not do without much instruction. We see them working most accurately without any experience in that which we could only be able to do by the expertness gathered from much experience." Yet, according to this same writer, and others, all this was accomplished in the case of Huber's experiment *intelligently*, though they had but just become aware, for the first time, of the existence of hexagons and rhomboids, and were necessarily as destitute of any sort of education or experience with regard to them as a new born babe!

Here, then, is one out of numberless instances of supposed animal reasoning, the examination of which would doubtless issue in similar results. What are those results?

(1) That if the alteration of the comb was effected *instinctively*, the limitation of "ordinary and natural circumstances" cannot be

maintained, since the conditions here were neither "ordinary" nor "natural".

(2) If the change was performed *rationally*, then appropriateness of action "without knowledge or design," and "without instruction, experience, or knowledge of consequences," cannot in any sense be characteristic of instinct, since they are equally compatible with reasoning, however elaborate and accurate.

Clearly, then, unless instinct and reason are practically identical, these instinctive limitations and conditions are wholly inconsistent with the existence of reason in the same individual.

Would it not be more consonant with the phenomena as a whole, and therefore safer as a hypothesis with which to start in any inquiry into animal psychology, to suppose instinct to be limited in the variety and extent of its range, not by place and circumstance, but by the scope of the *physical* powers with which it is conjoined in each individual? The denial of instinct in any given case presupposes knowledge, accurate and certain, concerning the scope of its operation. Yet what is the extent of our knowledge of instinct as supplied by observation? Simply that, *in the conduct of any animal, faculties adapted to meet the ever-varying contingencies of its life are brought into exercise, agreeably with the scope of its physical powers and the chief ends of its being.* This is all. The means, the mediate causes, by which those faculties are thus brought into exercise are as far beyond the reach of observation as those which form the crystal, the flower, or the amoeba. Whether the scope of instinctive action be really commensurate with that of the physical powers with which it is conjoined in any individual animal—in other words, whether animals *are* rational—still remains to be considered. It is noteworthy, however, that all attempts hitherfo made to restrict it within other and narrower limits, have resulted only in contradiction and confusion.

JOHN LE MARCHANT BISHOP.

VII.—CRITICAL NOTICES.

Logik. Eine Untersuchung der Principien der Erkenntniss und der Methoden wissenschaftlicher Forschung. Von WILHELM WUNDT, Professor an der Universität zu Leipzig. Erster Band. 'Erkenntnisslehre.' Stuttgart: Enke, 1880. Pp. 585.

Professor Wundt's volume contains plenty of matter, both in quantity and importance. A complete account of so large and many-sided a treatise would of course be impossible within the limits of a Critical Notice; and I can only hope to indicate a few of its main tendencies, sufficiently to enable readers to judge for themselves how far a perusal of this or that portion of the original might be of service

to them. And any criticism contained in the following remarks can only claim to represent first impressions produced by a very few months' acquaintance with a book which no doubt embodies the work of years, and which would require long and careful use to fully test.

The chief spirit by which Prof. Wundt's improvements in Logic are directed appears to be the aim at completeness. There are also, here and there, attempts at unification, but on the whole fulness rather than simplicity is the author's aim: the complaint which he has to lodge against traditional Logic is in nearly every case that of false or superficial simplification. This is observable already in the general position taken as regards the science, an attempt on the one hand to dispense with the easy method which the purely formal view adopts, namely, that of avoiding the ultimate difficulty by saying "Material truth is no object"; and on the other hand with the equally easy method of the "metaphysical or dialectical" view, that of saying in effect, "Come, let us construct reality out of the forms of thought: Thought and existence are one". *Scientific* thought, instead of starting from an assumed correspondence with reality, sets this up as the goal of its efforts, and "Scientific Logic" must do the same. Thus it will be seen that the task of Scientific Logic is considerably more complicated and difficult than that of either of the two systems between which it attempts to steer.

The same striving after completeness is also shown in Prof. Wundt's objection to the custom of singling out what is merely the most striking (or often only the latest in order of development) among many elements or among many various forms, and raising it to the position not only of representative—for this, I suppose he would say, occurs legitimately in the formation of every notion—but of being fundamentally the sole element of which the whole consists, or the one type to which all others must conform if they are to prove their right of existence. This complaint may be instanced chiefly by his attack on the ordinary plan of allowing the notion of Subsumption or Subordination to dominate every branch of logical doctrine. He combats this view on each of the three main fields,—the Concept, the Judgment, and the Syllogism,—substituting for it a variety of forms; and here it may be remarked that in every case the amendments must tend, however correct they may be, to introduce considerable complication in the practical application of logical doctrines.

The same spirit of completeness is to be seen also in another direction. One of the great merits, as well as the chief difficulty, of the psychological portion of the work is undoubtedly the extent to which the notion of Development pervades it. This might in fact be expected from an author who has done so much to systematise evolutional doctrines in Psychology. The mental processes involved in the formation of concepts, of judgments, and of conclusions, are not isolated acts easily arrangeable according to priority, but each is a growing process, liable to be found in any given stage of completion; and the difficulty consists in the fact that as soon as each begins to be far enough developed to clearly deserve its name, we find the different

processes more or less entangled and interdependent. The recognition of this fact is of course not altogether new, but I have met with no other book which comes so near to a consistent and at the same time intelligible exposition of it;—so *near* only, for although one cannot help feeling the reality and essential correctness of a view which tries to include the facts of growth in these processes, yet it seems undeniable that any really consistent attempt in this direction would interfere too far with language to satisfy the practical needs of intelligence. Human intelligence at least demands that if different names are to be applied to mark distinctions between different processes, we shall know clearly (or else assume that we know) where one process ends and another begins; and so far as we confess our ignorance of this, however real the ignorance may be, so far we surely tend to destroy the meaning of the names. Definiteness, as Prof. Wundt himself says in one place, is a logical postulate even where not in fact completely to be realised.

Attempting, however, to make the best of this difficulty, the following short account may sufficiently indicate in outline the course over which the author begins by leading us, in discussing the mental processes which lie at the foundation of logical thought.

The common view of Association as concerned only with such Presentations and Representations *(Vorstellungen)* as occur in succession must in the first place be enlarged so as to include the blending, into a complex product, of those which are given simultaneously; and on the other hand the name Association is to be restricted to combinations in which the "apperceptive" faculty plays only a passive part. Apperception is indeed always connected with Will, and is more or less concerned in all the various kinds of combinations; but a clear line may be drawn between active and passive apperception, the former occurring where the apperceptive faculty itself exercises a *choice* among the *Vorstellungen* offered to it, and the latter where its selection is determined merely by the degree or kind of stimulus which the various presented elements may provide: and this line is used to divide such combinations as are to be properly called apperceptive from such as are associative merely.

We get accordingly a cross division: *simultaneous* and *successive* Association, and *simultaneous* and *successive* Apperceptive Combination. Of the first of these, simultaneous Association, three forms are given: —(1) Associative Synthesis, or the formation of compound *Vorstellungen* through the blending of elementary[1] sense-impressions—whether homogeneous (in which case, since intensity alone determines the dominant elements, the synthesis is called "intensive": *e.g.*, in hearing,

[1] This of course proceeds on the assumption that all *Vorstellungen* which are recognisable are capable of being psychologically analysed into elements, though from the nature of the case these latter can never be found occurring independently. The assumption does not necessarily carry with it the further theory that these simple forms are identical with pure sensations *(reine Empfindungen)*, but stands to it in much the same relation as the assumption of Element in chemistry stands to that of Atoms.

smell, and taste), or partly homogeneous and partly heterogeneous (in which case the name "extensive" is applied: *e.g.* in sight and touch). (2) Assimilation, the blending of a newly appearing *Vorstellung* (A′) with a former one (A) which is reproduced by it through similarity; and (3) a process which stands to the two above-mentioned somewhat in the relation of mechanical mixture to chemical combination, and is named (following Herbart) "Complication". In this the *Vorstellungen* —which belong always to disparate sense-departments, separate in space, enter into the combination as undivided wholes, fast bound together indeed, but each distinguishable: *e.g.*, the form and colour of a body with its hardness and roughness.

Of simultaneous Apperceptive Combination, three kinds also are given, the two first of which—"Agglutination" and "Apperceptive Synthesis"—are hardly distinguishable from each other, the only difference between them being the degree in which the separate elements are lost in the whole product. Agglutination in fact always tends in course of time to become apperceptive synthesis,—as may be seen for instance in the case of many words, such as 'Herzog' and 'Marschall,' which were originally compound but which have gradually lost all trace of their compounded meaning; while in other names, as 'Heerführer' or 'Dienstmann' this has not yet completely taken place. It should be noticed here that Prof. Wundt appears throughout fully to appreciate the value of language, historically treated, as at least a collateral security for his views on the natural history of logical thought. In fact, although 'local signs' and 'innervation' are occasionally referred to—as for instance the latter when speaking of the effect of habit in successive associations, or again the former in the section on the Intuition of Space—far more frequent appeals are made throughout to the history of language than to physiology. Thus, language is used as a witness for Assimilation, and again for the stages of development in Concepts, and again more than once in speaking of the relation between these latter and Judgments, and in the discussion of the Categories and their interchange; while in the section above spoken of, relating to apperceptive synthesis, there is an interesting discussion (pp. 31—37) on the changes which are always taking place in names and their meaning.

The third form of simultaneous Apperceptive Combination introduces one of the most important of all subjects in Logic, the Concept; its fuller discussion is reserved for later chapters in the book, but in this place we may notice that the apperceptive process by which Concepts are formed is taken to consist essentially in the blending of one dominant individual Notion *(Einzelvorstellung)* with a set of allied *Vorstellungen*. The Concept being in itself unpicturable must at any moment be represented by some one single *Vorstellung* of the set: the apperceptive faculty is first exercised on the selection of this representative, and secondly on the selection of some element or elements out of it, as dominant. The most important fact about the Concept, looked at psychologically, is that it sets several *Vorstellungen* in relation to each other. Accordingly the formation of Concepts is

closely connected with the development of the apperceptive "Stream of Thought".

Successive Association can always be clearly distinguished from the simultaneous combinations. There is no blending, but each single *Vorstellung* retains its own independent properties unaltered. It is, however, liable to be *interrupted* by a process of Assimilation or Complication; and it should also be noticed that the requisite passivity for a chain of pure association of any considerable length cannot often occur except in dreams, madness, and such-like cases.

Not so easy is it to distinguish simultaneous and successive Apperceptive Combinations: here there is a continual interchange between the two forms, the former always arising out of a combination which was originally given successively, while on the other hand the simplest forms of the latter unfold themselves through the dismemberment of a compound notion (*Gesammtvorstellung*).

Successive Apperceptive Combination (or the *Gedankenverlauf*) is essentially distinguished from successive association by the fact that while the latter runs straight on indefinitely ($\overline{A\ B\ C\ D}$ . . .), the former is always a separate whole of which all the parts, though preserving their separateness, stand in a mutual connexion governed by the law of dual division: when only a single application of the law takes place, and the *Gesammtvorstellung* is accordingly divided into only two related parts, as $\widehat{A\ B}$, we get the simple judgment, while the compound forms result from a repeated application of the law, and may be symbolised:—

$$\widehat{A\ B\ C}, \quad \widehat{A\ B}\ \widehat{C\ D}, \quad \widehat{A\ B\ C\ D\ E}, \text{ \&c.}$$

Lastly, two or more of these *Gedanken*, or Judgments, may be themselves linked together. This also occurs either with active, or only passive, apperception, but it is entirely with the former case that Logic is concerned. Such combinations are again divided into simple and compound,—the former when only two judgments, whether themselves simple or compound, are combined; and the latter when more than two enter into the combination. In the forms of these chains and interweavings, all connected processes of thought, inductive or deductive, have each their own mode of expression.

The next chapter (Bk. I., chap. iii.) deals, in a preliminary manner, with the extremely difficult question of the bridge between Psychology and Logic. Between the psychological and the logical laws of thought there is, as the author himself says, an "indissoluble tie" which renders it no easy matter to make sure that when we are trying to speak of the one we are not really speaking of the other; and yet, on Prof. Wundt's scheme, it is necessary to face the questions—which of course the purely formal Logic avoids—how the logical as distinguished from the psychological laws of thought arise and whence they get their binding force. We have seen already that the Will is a considerable factor in all apperceptive combinations, but besides

"spontaneity"[1] there are two other qualities which are found in certain of the combinations of thought, and these are *Evidenz* and Universal Validity: since then we find certain of the combinations of thought already possessing these qualities, we erect them into the conditions of all *logical* thought. Logical evidence rests neither on the processes of thought, nor on the material with which thought works, but on its *results:* the security of the results of thought is the sole source of logical certainty. Evidence may be either immediate or mediate, but since mediate always presupposes immediate evidence we cannot possibly give proper account of the former without inquiring into the nature of the latter. Immediate Evidence has its source in Immediate Intuition, in the widest sense (thus by no means in space-intuition alone, as Lange would have it); yet this Intuition is not itself the evidence but only as it were the predisposing cause, the moving cause lying in the power which thought possesses of combination and comparison: still, there is no logical thought without Intuition. The connexion between immediate and mediate evidence is extremely close: in the former our thought combines elements which were immediately given in Intuition, in the latter it treats the combinations thus arising as themselves elements of further combinations, and as set in relationship to each other according to the intuited coherence which exists between them. Syllogism is in fact an amplification of the judging process; it rests on a comparison of judgments, just as the judgment rests on a comparison of notions: the same combining activity of thought lies at the root of both. In this way Intuition is the foundation of mediate as well as of immediate evidence. The doctrine of Concepts and of Judgments is concerned with logical thought in the form in which it rests on immediate evidence: the doctrine of Inference in the form in which it rests on mediate evidence.

Before proceeding however to discuss the doctrine of Inference it will be well to consider more closely the relation between the Judgment and the Concept. This is one of the points in which the difficulty noticed above—namely that introduced by the recognition of Development—makes itself felt; for however it may be with the earliest origin of "these two different forms of apperceptive process," yet as soon as they begin to be at all advanced in their development we find each helping forward the other's growth, each in a measure dependent on the other's help.

We must not, says Prof. Wundt, picture the development of thought as if Concepts first took shape, and then, existing separately, were afterwards put together into Judgments: but the starting-point is the *Gesammtvorstellung*, a product, as above explained, of simultaneous apperceptive combination. The content of the Judgment is first given as an undivided whole, and the Judgment proper does not arise until this is analysed[2] in our discursive thought. The word *Urtheilen*, he

[1] The question of the Freedom of the Will is not opened, *practical* freedom being sufficient.

[2] The explanation of the Judgment as (from one point of view) an essentially analytical process must not be confused with Kant's distinction of analytical and synthetical, with which it has nothing to do.

suggests, appropriately marks out the psychological process involved in Judging. In actual fact we are here concerned with "ein ursprüngliches Theilen der Vorstellungen": the Judgment separates the *Gesammtvorstellung* into its component parts, thereby carving Concepts out of it and setting them in relationship to each other.

Concepts are, then, "results of a process of cognition" and yet in a certain sense they are the elements of logical thought. Although their growth proceeds simultaneously with that of the Judgment, and although the most highly developed forms of them (those used in Science, and distinctly *not* metaphysical) presuppose all other logical functions, yet their least developed forms only, as it were, point out the place where such a result is to be obtained. Prof. Wundt would apply the name even to these less developed forms, distinguishing them however by the epithet "logical" as opposed to "scientific," since in them the definiteness and universal validity which are said to be respectively the subjective and the objective essential attributes of all Concepts, are only postulated, not by any means completely attained. Perhaps the best account given of the exact difference intended between the Concept and the Judgment is where it is explained (p. 50) that in the former only a single dominant *Vorstellung* stands out, while the simplest successive act of thought requires two: thus if we express the Concept by the formula hA, the Judgment should be expressed h_1h_2A.

Assuming, then, Concepts (or *Terms*, as it will in most cases be more convenient to call them[1]) as independently existing formations, the author next discusses the possible relationships into which they may enter, in the shape of Judgments, and the further combinations in which these latter may be put together to form Syllogisms.

As already mentioned, Prof. Wundt finds that the explanation of everything as subordination or subsumption plays far too large a part in the ordinary Logic. He finds traces of its influence everywhere, and his aim is always to show that the view given by it is superficial and incomplete. He sees it, for instance, in the constant attempt to find one most general and most abstract category which should include all the others: to it again he traces the doctrine that Concepts are merely sums of attributes, and along with this doctrine all its corollaries,—*e.g.*, that content and extent vary reciprocally, that the concreteness of terms depends on the number of attributes which they sum up, that abstraction consists simply in a removal of attributes; and he maintains that the 'extent' of a term has in fact no meaning except as applied to those which are really generic terms, and that even in their case the information conveyed in the above doctrines is not particularly fruitful.

In speaking of the Categories the author finds that those of Aristotle are not so casually raked together as Kant asserted; allowing however that, through confusing to some extent grammatical with logical dis-

[1] Even proper names are said to have a general meaning, since they refer to an individual in many different conditions.

tinctions, the Aristotelian categories are more numerous than necessary. He would reduce them to four[1]:—Object (*οὐσία*), Attribute (*πόσον* and *ποῖον*), Condition (*κεῖσθαι*, *ἔχειν*, *ποιεῖν*, and *πάσχειν*), and Relation (*πρός τι*, *ποῦ*, and *πότε*); only the first three of which, of course, correspond to 'categorematic terms,' the fourth being found in the shape of adverbs, prepositions, case-endings, tenses and moods, and being therefore properly speaking[2] not a category at all. In this connexion attention should be called to an interesting exposition (Bk. II., chap. ii., sect. 2) of the manner in which, in order to meet certain needs of thought, the category to which any given term belongs can be changed,—so that, in fact, in the case of the more abstract terms it often becomes hard to say what their original form was. Through this "shifting of the category" there is, says Prof. Wundt, a gradual increase in the number of Object-terms; for whatever can be thought as a term at all can if required be made into an object, while the opposite movement (from objects into attributes or verbs), though also to be found, is, he says, of comparatively little importance. Even in the earliest beginnings of language, ever since the period of Roots, the same tendency (towards increase in the number of Object-terms) is observable, and its importance throughout lies in the aid which it gives to all abstract thought.

The view here taken of Abstraction demands also some notice. The process of Abstraction is said to consist, not in a subtraction of attributes but, in a fixing of relations which our thought finds amongst the elements presented to it. Every notion consists of elements which enter also into more or less numerous other notions, and it is the particular mixture and manner of combination of these which alone constitutes the essence: we put the notion together out of those relations which appear to our thinking essential. The proper distinction between Abstract and Concrete is given as turning on the question whether or no an *adequate* (*i.e.*, perceptible by the senses) "representative *Vorstellung*" is to be found: 'man' or 'beast,' for instance, remains—as under the Scholastic distinction—concrete: 'humanity' also remains abstract: but on the other hand 'just men' becomes an abstract term as much as 'Justice'. The author claims that this distinction helps to explain the growth of the abstract meaning out of the concrete, and the fact that the very same word may be at the same time to one person abstract and to another concrete: and it may further be noticed that such a distinction agrees, far better than the old one, with popular usage.

Having mentioned these few isolated points connected with terms when regarded independently, we pass to the relations which may exist between them, to the expression of such relations in the form of Judgments and the binding together of Judgments in the form of Syllogisms (Bks. III., IV.).

[1] Following here almost precisely the same lines as Sigwart and Lotze.

[2] *I.e.*, if we mean by the 'categories' the most general classes of independent terms.

Here, the two chief intentions of the author appear to be,—(1) to distinguish a variety of forms both of Judgment and Syllogism, thus avoiding as far as possible any reduction to one pattern, whether categorical, hypothetical, or disjunctive, and especially to combat the rather crude explanation of everything as subordination or subsumption; and (2) to express in syllogistic shape the attainment of new truths as well as the establishment of the consequences of what has been already admitted.

As regards the first of these points, Prof. Wundt is clearly in the right, so far at least as purely scientific purposes are concerned, although he seems rather to neglect the value—one might almost say the necessity—of simplification (even if to some extent forced or fictitious) in these matters for purposes of practice, and to overlook the possibility that it was the desire to render the science practical, rather than mere incompleteness of view, which has led to the prevalence of the treatment which he attacks. He admits its value, indeed, for certain purposes, but thinks that on the whole it does more harm than good, —chiefly on account of the number of cross-classifications which must follow from it, and which thus hinder rather than help any orderly arrangement. He says nothing however about the far greater ease with which errors may be detected when the meaning of propositions and syllogisms is simplified as far as possible, at the cost perhaps of a little artificiality or clumsiness of expression, or even of a total loss of that part of the meaning which is irrelevant to the immediate purpose in hand. Accordingly Prof. Wundt would distinguish carefully those judgments whose real primary intention is to classify in genera and species from those to which for merely temporary purposes the form of subsumption may be given:—"the Judgment of Subsumption is in the real order of development the latest of all, and hence it is obvious that only a small number of the needs which the judgment should satisfy can be covered by it". And he is equally dissatisfied with subsumption as the foundation of syllogistic doctrine, and on much the same grounds, superseding it by a variety of other forms, of which it may be said that they at any rate show great care in attempting to recognise and distinguish all the different purposes for which syllogisms can possibly be used.

As regards the second point, the expression of Inductive Inference in syllogistic forms, it seems to me that the chasm between necessary (in the sense of 'already admitted') truth, and the kind of 'necessary' sequence which a successful observation of nature may give us, is only too easily leapt both in common life and in Science, and that Logic ought above all things to recognise its depth and importance, and to preserve every barrier which has already been erected there. The ease with which the leap is made is a result, no doubt, in most cases, of some confusion between the purposes of proof and new induction; and such a confusion cannot altogether be laid to Prof. Wundt's charge[1]: the only question is whether this treatment, by which induc-

[1] Some passages, however, might almost justify the suspicion. See Note on p. 420 *infra*.

tive syllogisms are exhibited side by side with deductive ones and thus gain an appearance of being on an equal footing with them, does not tend to increase a danger which is already great enough. The inclination to convert propositions simply, without any warrant beyond the ease with which the formal process can be accomplished, is always so strong that any arrangement of the subject which may act as a check on this tendency has advantages which ought not to be overlooked.

Both these points, however, readers will be better able to judge after having seen something of Prof. Wundt's arrangement.

Since the establishment (predicatively,—by means of the copula) of a relation between any two terms must always take the form of a Judgment, an inquiry into the possible relations between independent terms lies at the root of the doctrine of the Judgment. Other divisions, such as that into indefinite, singular, and plural judgments, or again into narrative, descriptive, and explanatory, though required for some purposes, are of minor importance; while the usual A E I O distinctions are to be superseded altogether, the division into universal and particular as acquiring whatever importance it possesses merely from the ambiguity of the word 'some,' and that into positive and negative as tending to preserve erroneous views on the subject of negation.

These relations then (which, by the way, the author prefers to represent by means of a straight line divided into sections, rather than by means of circles,—on the ground that circles can only represent subsumption[1]) are six in number: four "definite," and two "indefinite". The first two of the definite relations, Identity and Subordination, and also the judgments which correspond to them, and the syllogisms of Identity and Subsumption[2] need not be more than mentioned here, since beyond a very clear and complete exposition of the different varieties of these and especially of the different purposes for which they are respectively applicable or commonly applied, there is nothing which particularly calls for remark.

Co-ordination is taken as including (*a*) Disjunction, (*b*) Correlation, (*c*) Contrary opposition, (*d*) Contingence, and (*e*) Interference: of these however, only the first two have special forms of Judgment corresponding to them,—the disjunctive and the alternative: and such judgments find their chief application in special forms of the third class of syllogisms (conditionals).

For the fourth of the "definite" Relations—that of Dependence—great importance is claimed, and the author's Axiom of the Syllogism[3] appears to be specially framed in order to give prominence to it.

[1] It may be questioned whether any figure can really avoid this objection, since all figures of whatever shape must necessarily represent *extent*. The point is however perhaps not of very great importance.

[2] Except as regards the syllogisms of Probability and Analogy, which are included under those of Subsumption, and which must be slightly mentioned later.

[3] It would be more correct to say, the fuller explanation which he gives of the somewhat useless Axiom "Mit dem Grund ist die Folge gegeben".

Rejecting the *Dictum de Omni* (and Lambert's additions of *Dicta de Diverso*, *de Exemplo*, and *de Reciproco*) as being only applicable to syllogisms of subsumption, and rejecting Kant's formula and the *Nota notæ* as being not even applicable to all of these, and rejecting further the principle of Substitution as being itself no principle but merely a process resting on the principle of Identity, he gives us the General Principle of Relation—"When different judgments are set in relation to each other by means of terms which belong to them in common, then those terms in the said judgments which are not common to both also stand in a relation to each other, which may be expressed in a new judgment." The relation of Dependence, the author complains, has been almost entirely neglected by logicians, and yet it is one of the most wide-reaching and universal of all. Two kinds are distinguished,—one-sided and mutual: Space and Motion may illustrate the former, Law and Custom the latter. The judgment, however, "Motion is dependent on Space" would not by itself contain very much information, and accordingly the function of the "Judgment of Dependence" is, by introducing other terms which also enter into the relation, to express as far as possible the *kind* of dependence intended: thus, we define Motion as "change of position in space," or still better we express the relationship in a compound judgment, as "An object moves when (or if) it changes its position in space". Among the forms then which these Judgments of Dependence take, the conditional or hypothetical are the most frequent and important, although here again Prof. Wundt remarks that this most lately developed form should not be allowed to throw the older ones completely into the shade: accordingly, "local" and "temporal" dependence have also a place in the class, the kind of dependence being of course marked by the particular conjunction used,—*e.g.*, 'where' or 'when'; and under conditionals proper are distinguished four minor kinds,—the *Begründungsurtheil* ('if' or 'because'), the *Beschaffenheitsurtheil* ('as' or 'that'), the *Zweckurtheil* ('what . . . for' and 'in order that'), and the *Urtheil des Hülfsmittels* ('wherewith').

It is a relief to find however that not all of these are to be employed in the formation of special kinds of syllogism: besides the syllogisms of Identity and Subsumption, there are only two more main classes,—"Conditional" and "Relational"—the former being subdivided into "verifying" and "subsuming," the latter into "comparing" and "connecting".

It is unnecessary to follow all the syllogistic forms out in detail. Both the last classes again show immense care in recognising the different purposes for which the different forms are useful: but the weak point of the treatment consists in the fact that amongst Conditional Syllogisms the familiar formal fallacies of 'affirmed consequent' and 'denied antecedent' are allowed a footing (with their conclusions vaguely qualified as '*probably or certainly*'), and that of the greater number of Relational Syllogisms the most that can really be said is that the desired (or guessed) conclusions are—like those just mentioned—not absolutely excluded by the premisses; the remainder being

cases where, although there is no formal fallacy, the conclusion is left so indefinite that unless taken for more than it is literally worth it is practically useless.

It must be said that so far as the avoidance of error is one of the purposes of Logic the treatment here employed is open to objection. One of the commonest causes of error is the confusion of the very distinction which this arrangement tends (however intentionally) to obliterate, namely the distinction between truth which is being inferred, and that which is already admitted: and the inevitable result of any tampering with this distinction is a considerable vagueness as to the kind (or more strictly the *conditions*) of certainty properly attaching to the conclusion. The fact that forms of Inference which, if expressed syllogistically (as all *can* be), would take the shape of Undistributed Middle, or Illicit Process, are perfectly valid, or are a useful—or even essential—element both in Science and in common life, is surely well-recognised by everyone who has advanced beyond a very early stage in Logic: but after all, Syllogisms which violate the old rules give a totally different kind of certainty in their conclusions from those which comply with them,—a kind of certainty perhaps no lower ultimately, but the real testing of which is to be accomplished on a different field. Of course Prof. Wundt himself to some extent recognises the distinction, in fact indirectly calling attention to it in more than one place[1]; but many expressions point the other way[2], and the whole arrangement of the subject tends to minimise it, not only through appearing to bridge the gulf between Induction and Deduction, but through drawing a hard line between Syllogism and Immediate Proof (which he calls "Transformations of Judgments").

Again, the language used in describing these Inductive Syllogisms is sometimes distinctly misleading. We find for instance given (p. 318) as a "completely binding" argument, the following:—"If the Earth turns on its axis, falling bodies must diverge from the perpendicular; now, the experiment shows that they do so diverge; therefore the Earth must turn on its axis". Of course we also find it admitted, not only beforehand but again a little lower on the same page, that the truth of this conclusion depends on the existence of mutual determination between antecedent and consequent in the first premiss: what renders the above argument valid, in short, is a fact not stated in its premisses but guessed in addition to what they strictly assert,—partly perhaps by means of them, and partly also by means of extraneous considerations. Had the argument run:—"If falling bodies, &c., the Earth must, &c.; now falling

[1] *E.g.*, at the top of p. 323; and again in the symbolical part, where the "ambiguous" syllogisms are fully set out, and we find some admitting of four, five, or even seven different conclusions.

[2] *E.g.*, in addition to the passages incidentally mentioned in this notice, the definition of Inference as the *arising* of new judgments from old ones; or the statement (p. 288) that no fundamental difference can be established between deductive and inductive reasoning.

bodies do, &c.," it is clear that, in order to test the truth of the conclusion we should merely have to inquire into the truth of these two premisses: while Prof. Wundt's argument, however binding it may be, compels us, in order to test the truth of its conclusion, to investigate in the first place a very different question: after which we are exactly in the position last above set out, and can then proceed as usual. In other words the binding force of the argument given by Prof. Wundt consists in the truth of a fact which will enable us to state the premisses so as to avoid the formal fallacy which, in the shape given by him, they bear on their face. And the same objection appears to me to lie against every attempt to range side by side syllogisms which break the ancient rules and those which obey them. Wherever the author's Relational Syllogisms escape committing a formal fallacy, as (p. 324) "A has the attribute M, B has the attribute M, ∴ A and B agree in one attribute," it is needless to say that the result is exactly as barren for purposes of *discovery*, as any of the "meaningless logical artefacts" to which he objects (pp. 300-302), while for purposes of proof the latter stand on exactly the same level as this. On the other hand, whenever we do as a fact employ for making a real inductive leap forms resembling those whose proper function is proof, there, along with this resemblance, must always be found this one point of difference—that such forms are not themselves unambiguously valid until, by means of some further considerations, we have the liberty to convert them into the shape that is formally correct. Would it not be simpler, and less liable to mislead, if we continue to recognise the unambiguous form—namely such that whatever is asserted in the conclusion must be asserted by implication in the premiss or premisses—as essential for all proof (or *retrospective* inference), whether mediate or immediate, and as essentially distinct from *advancing* inference by that very fact?

It should be noticed further that although Prof. Wundt recognises the problematical character of his Relational Syllogisms (where they amount to an expressed induction), he draws a distinction between these and the Syllogisms of Probability and Analogy—in which of course also a qualified conclusion is obtained,—ranging these latter under the Syllogisms of Subsumption. Probability in the proper sense of the term, he maintains, occurs only where the doubt really lies in the major premiss, which mentions a number of cases as possible, with a certain balance in favour of one or more; while Syllogisms of Analogy are those where the doubt lies in the minor premiss, the object or class spoken of being only more or less *like* that which constitutes the middle term. It is hardly necessary to add that the Probability-syllogisms so far as unnumerical, and the Analogy-syllogisms altogether, lie open to exactly the same objections as have been already raised.

The two "indefinite" relations,—simple Negation[1] and Disparateness

[1] As distinguished both from contrary opposition and from contingence: nearly the same as what is usually understood by contradictory opposition, but more limited.

—contain some points of interest. In the former the positive term is definite, while the negative remains indefinite but is limited and not taken as the whole remainder of the universe,—not even as the whole remainder of the 'universe of the proposition': thus, in the linear representation the positive term would be some one portion of the line, say A B, and the negative would be any *one* other portion, say E F, of which the exact position is undetermined but which in most cases lies near the opposite extremity.[1]

Corresponding with these two relations we get a useful distinction in negative judgments, the former giving us the "negatively-predicating" judgment, where, in a grammatically negative shape, some more or less definitely conceived positive assertion is made (*e.g.*, The orang-outang has no hair on his face); and the latter giving us the "denying and dividing" judgment, where we simply state our inability to predicate either term of the other (*e.g.*, Silver is not lead). It will be seen that this distinction helps to reconcile the disputes as to which part of a proposition contains the negation, since in the former class it belongs clearly to the predicate, and only in the latter to the copula, the latter being convertible without loss of meaning, while, if the former are to keep their meaning under conversion, changes in the structure must be made.

Books V. and VI. (on the "Fundamental Conceptions" and the "Laws" of Knowledge) contain so much that is interesting, and range over so wide a field, that it is impossible here to give even a bare outline of them. In both, along with Prof. Wundt's own views, there is a good deal of very clear and concise history given of the various opinions held on the leading questions from earliest times: as instances of this may be specially mentioned the chapters on Causation and Design, and also the chapter on Substance.

As regards the author's own views, the notion of Development again frequently shows itself, though here its application is of course somewhat different and it consequently introduces less difficulty than in the earlier portion of the work. And, as before, the part assigned to the Will is important, especially (*e.g.*) in its connexion with the discussion on the Thing-in-itself, with "Logical Causality," and with Error and Truth. The relation of his three categories—Object, Attribute, and Condition—to inner and outer experience, is also very carefully set out and explained; and the Forms of Intuition receive a full treatment, as also the various sets of Axioms,—logical, geometrical, arithmetical, 'phoronomical', and physical. In the chapter on Causation great pains are taken to keep the distinction between the physical and the metaphysical interest clear, and also that between the principles of Causation and Design, and again that between Cause and Reason; and the author lays considerable stress on the view that causes as well as effects are to be conceived (as far as possible) as *events*, or processes occupying time, not as things.

[1] Of course the fewer the members of disjunction, the more negation loses its indefiniteness: and in Mathematics for instance, where negative and positive mean simply subtraction and addition, each is equally definite.

The section (Bk. V. 1) on Facts and Hypotheses, and on the correct and incorrect use of the latter, is particularly interesting and useful. There are one or two points which seem to call for a few special remarks.

As to the criterion of objective certainty: instead of starting from the primary subjectivity of all perception, and then seeking for marks by which to distinguish the merely subjective elements in it from those which have both a subjective and an objective side, he suggests that the only true criterion is to be found by following the method of the separate sciences, by reversing the above process, starting with the assumption of the objectivity of everything which is perceived, and gradually eliminating one element after another as "purely subjective,"—the residuum giving us not merely the nearest approach to objective certainty that we can at any time possess, but in many cases an objective certainty which is theoretically as well as practically perfect. Everyone must admit that some such method is the only practically sound one; but why attempt to disguise the fact that it is a begging of the question, or to draw a distinction between the "certainty" so reached, and high probability? The fact that the Earth moves round the Sun, says the author, is *certain*, because we have found that every supposition which contradicts it is not only improbable but impossible. Surely only a finite number of contradictory suppositions have been examined, and the supposition that these are all that can possibly exist is, however practically valid and useful, theoretically a leap in the dark? For all practical purposes it may be "objectively certain" that the phenomena will never be explained by the fact that, while neither Earth nor Sun really moves, our senses somehow delude us into thinking so: but wherein lies any absolute impossibility in some such delusion? The proposal to drag into the realm of objective certainty (in any sense except that of 'practical') all supposed facts against which no sound *definite* objection can be thought of, can only be called an attempt to shift the burden of proof off the shoulders of those who make the assertion; and if this were allowed to pass, we might be logically compelled to admit also (*e.g.*) that Whately had successfully defended the "objective certainty" of some well-known dogmas which by no means everybody is to-day able to consider even practically certain. It seems to me, too, that the author while allowing that the future always introduces an element of uncertainty, fails to recognise the future element that lies hidden in every assertion which claims to be in any way verifiable. The assertion, for instance, that the Earth turns round, even if taken quite apart from the *direct* future reference which is probably always included in it,—even if restricted in its direct meaning to the immediate present and an indefinite past,—yet claims to be (practically) verifiable; and since verification, however often repeated, is a process taking time, so before we begin the process, or begin its latest repetition, its end and result must lie in the future: and in the fact that we may always repeat, at intervals through all future time, old verifications that were believed to be secure, and may thereby sometimes get a different result,

lies the one speck of uncertainty that remains in every assertion, even after the completest possible 'verification' of it has been (for this time) successfully conducted.

So far as this portion of Prof. Wundt's work may be intended as an answer to Scepticism, I think it may be predicted that Sceptics—those at least who keep strictly to their own unpractical territory—are no more likely to be satisfied by it than can believers in the comparative value of Science be converted by Mr. Balfour's recent clever statement (in *Philosophic Doubt*) of the case for the other side. Both these authors seem to expect in human beings a closer correspondence between theory and practice than is really to be found; and, on the strength of this plausible but unsafe expectation, both invade ground which does not belong to them. Mr. Balfour, that is to say, seeing that the scientific man is theoretically in no better position than the systematically unscientific, would therefore deny him the right of deriding the latter in matters of practical interest (such as, the statements made by Theology as to matters of fact); while Prof. Wundt, seeing that judged by practical results the scientific man is in a much better position, seeks (also unduly, as it seems to me) to prevent the Sceptic from indulging his taste for stating uncomfortable, but practically harmless, facts. In the presence of all the acts of useful self-deception which help to make the world go round, may we not admit that Theory and Practice cannot as yet be safely presumed to coincide?

ALFRED SIDGWICK.

Der thierische Wille. Systematische Darstellung und Erklärung der thierischen Triebe und deren Entstehung, Entwickelung und Verbreitung im Thierreiche als Grundlage zu einer vergleichenden Willenslehre. Von GEORG HEINRICH SCHNEIDER. Leipzig: Abel. 1880. Pp. xx. 447.

This is a valuable contribution to animal psychology. The author aims at giving a complete survey of animal actions, classifying them, and interpreting them according to one or two psychological principles. Herr Schneider is a disciple of Darwin and Haeckel, and appears to have been encouraged by the latter in developing his line of research. He felt dissatisfied with the current conceptions of reflex, instinctive, and voluntary actions, and wished to reconsider the whole subject of animal life on its active side. In order to do this, and to do it in the spirit of the evolution-philosophy, he determined to carry on a series of carefully planned observations on the movements of the lower marine organisms. This object he accomplished partly in the island of Crete but mainly in Naples where he remained five years. Having encountered certain difficulties at the hands of Dr. Dohrn, who founded and presides over the Zoological Station at Naples, the writer reflects upon the way in which Dr. Dohrn uses the subsidies granted him by the German Government. Yet in spite of obstacles Herr Schneider was able to collect a goodly number of facts, the incorporation of

which into his volume lends it an additional interest and scientific value.

By selecting the special subject of animal actions Herr Schneider appears to deal with the most patent aspect of the mental life of the lower animals. At the same time it is clear that to classify and interpret the movements of these organisms some ideas must have been reached respecting the intellectual and emotional phenomena with which they are connected. In point of fact Herr Schneider has to devote a chapter to the Feelings and their classification. He does not separately discuss the question of the differences in intellectual operation in the various grades of animal life, though it may be said that his treatment of the problem of animal actions throughout assumes certain well-marked differences of intellectual power. One cannot help thinking that the whole subject would have been made clearer by a preliminary survey of these differences as based on comparative anatomy and the doctrine of evolution. This is the more desirable since what Herr Schneider chiefly aims at is to upset the notion that similar actions in different regions of the animal scale necessarily imply the same mental antecedents. The author works at a distinct disadvantage throughout in not having made the acquaintance of Mr. Herbert Spencer's systematic review of psychical phenomena. He appears to think that his present volume is the first attempt to trace comprehensively the gradual development of animal will in connexion with that of animal intelligence. So far as the "explanation" of these actions is concerned the work is not new. What is new is the painstaking and exhaustive bringing together and classifying of the various kinds of action.

The volume opens with what may easily strike the reader as an unnecessarily long discussion of the ideas of Ends and Adaptation. The supposed mystery of adaptation to some purpose is got rid of by saying that it is only one out of an infinite number of possible cases. Passing to his proper subject the author has an interesting chapter on Instinct and Will, in which he protests against the sharp separation of the two. On the one hand instinctive actions are conscious, like voluntary ones, and performed under the pressure of some feeling and active impulse *(Trieb)*. On the other hand the so-called voluntary actions of men are aided from the first by impulses, such as those which appear in children's play, which are clearly instinctive. Even the highest manifestations of will may be regarded as in part instinctive, if by instinct we mean the impulse to an action the final end of which is not consciously represented; for the one end of all actions is preservation of the species, and this is really never the aim or motive in volition. It is an added error to confine the term volition to human actions seeing that memory, ideation, and conscious purpose are shared in by all the higher animals from the cephalopods upwards.

A chapter on Feeling resolves all varieties into pleasures and pains, which must be regarded as subserving in some way the great end of organic life, the preservation of the species. If we classify feelings according to their height in the scale of organic evolution we must

distinguish between those dependent on and excited by sensation, perception, ideation, and thought. Each of these groups falls into four sub-classes according as the actions with which the feelings are connected are those of procuring food, self-defence, reproduction, or rearing the young. Besides these feelings which are called "direct feelings of preservation" there are others termed "indirect feelings of preservation," namely the æsthetic and social feelings.

Feelings of Sensation are nothing but the sensations themselves, for in this lowest stage of psychical life there is no differentiation of the emotional and the intellectual states. By a Feeling of Perception is meant one excited by an object, by direct contact with it and stimulation of the nerve, and not by means of an idea or mental representation suggested by the object. Thus fear may arise in an animal at the presence of an enemy quite apart from any idea of impending harm. Such conjunctions of certain perceptions and certain feelings might arise solely by means of natural selection, though it is probable that association has had most to do with their development; that is to say, the pleasures or pains experienced with actual contact, or as sensations, come, in the case of animals endowed with organs of perception, to be suggested by the objects when only perceived. In the case of a proper feeling of perception, however, as distinct from one of ideation, there is no distinct representation of these experiences, and the genesis of such direct emotional accompaniments of perception is accounted for partly by association, partly by the effect of habit and inheritance on feelings once belonging to those of ideation. By a Feeling of Ideation the author means one which depends on the representation of some sensation or perception. Such feelings arise through association when the power of representing sense-experiences, either with or apart from a present perception, is developed. Finally a Feeling of Thought is an indirect feeling of ideation in the same sense as this last is an indirect feeling of perception. These feelings include all that are excited by a sequence of ideas answering to a causal connexion between facts, of which the first is in itself indifferent and only excites a feeling as leading up to the final idea, that is the end desired. Speaking roughly, one may call the lowest animals up to the inferior molluscs sentient animals, the superior molluscs and articulata percipient animals, the vertebrates exclusive of man ideating animals, and man a thinking animal. The evolution of this scale of feeling is referred to the principle of the "gradual facilitation of the process of discrimination and the genesis of the feeling": that is to say in each successive stage the feeling is excited less directly and by help of a less powerful exciting cause.

Through the peculiar structure of the nervous system sensory impressions act as stimuli to the motor organs. The active impulses correspond to the feelings. To the opposed feelings, pleasure and pain, answer the opposed impulses, desire and aversion. And to the fourfold division of the feelings given above there corresponds a fourfold division of Impulses, Sensational, Perceptional, Ideational and Rational or Reflectional. The two former correspond roughly to 'instinct,' the two

latter to 'volition' in the narrow sense. Similarly these Direct Impulses are supplemented by Indirect, answering to the indirect feelings of preservation. Finally there are certain auxiliary impulses which modify the course of the movements, namely the Impulse of Sequence, and that of Association. By the former is meant the tendency of actions habitually performed in a certain succession to recur in the same order; by the latter, the tendency of actions simultaneously performed to recur together.

The rest and largest part of the volume is occupied with a detailed exposition and illustration of these different classes of impulse. There is no space here for a complete summary of this interesting part of the work. A remark or two on some of its most striking points must suffice.

The author in dealing with the most elementary stage of impulse, that depending on actual contact of object and organism, and sensation, is careful to define and limit the range of reflex action. He thinks with G. H. Lewes that many actions have been too hastily set down as reflex, and argues that the rapid sequence of sensory stimulation and movement is no proof of unconsciousness. Even if we allow that the actions of a decapitated frog are now performed without feeling, it is an error to reason that they must always have been so performed; and the author leans to Lewes's opinion, of which, however, he seems to have no knowledge, that the spinal column may be a centre of sensation in the lower vertebrates. By adopting this view of the so-called reflex actions we are able to bring them under a wide definition of Will, making them the starting point in the evolution of the higher and commonly recognised voluntary actions. For wherever there is sensation or feeling there is motor impulse; and, owing to the inherited nervous structure of animals, particular classes of sensations serve as instinctive impulses to certain appropriate kinds of action. In dealing with impulses of perception Herr Schneider argues effectively against Von Hartmann's notion of animal clairvoyance, and shows there is not the least mystery, on the theory of evolution, in a direct succession of an impulse of desire or aversion on the presentation of an object, apart from any representation of the end to be realised thereby. Most of the much admired instinctive actions of insects are regarded as the outcome of perceptional impulses. And just as in the case of the feelings, so in that of the active impulses indissolubly connected with them, the ideational stage tends by the law of repetition and habit to pass back again into the perceptional.

The filling in of the details of the plan here described is carried out with great thoroughness. So far as I know there has never been any systematic grouping of all the known animal actions and habits at all comparable with this in comprehensiveness, clearness of arrangement, and psychological insight. The reader will not fail to admire Herr Schneider's general caution in determining the character of a particular action, as resting on an ideational or perceptional impulse, and so on. As he more than once says, in criticising every single action of an animal we must consider all the other parts of its life, and the stage

of psychic evolution to which it belongs. Thus the preparing of pitfalls by the ant-lion and the armadillo, though in appearance similar actions, must be interpreted differently. A consideration of the general psychical character of the classes to which these species belong leads us to infer that while the armadillo works by help of representation and reflection, the ant-lion does so by help of perception and sensation only. With respect to the main purpose of the book, the determination of the nature of instinct in relation to volition in the narrow sense, the author is to be congratulated on having attained a large measure of success. Some of the instinctive actions of animals low down in the scale may still remain a matter of great doubt. But by following out Mr. Darwin's idea and regarding the so-called instincts as partly the result of sensori-motor arrangements fixed by natural selection together with association, partly the result of habit acting on actions once ideational, Herr Schneider has done much to clear up the mystery of the subject, and at the same time to provide a sound basis for the development of animal will as a whole.

JAMES SULLY.

The "Method," "Meditations," and Selections from the "Principles" of DESCARTES, translated from the original texts. Sixth Edition. With a new Introductory Essay, Historical and Critical. By JOHN VEITCH, LL.D., Professor of Logic and Rhetoric in the University of Glasgow. Edinburgh and London: Blackwood, 1879.

The distinguishing characteristic of the present edition of Professor Veitch's *Descartes* is the Introductory Essay, extending over 181 pages, and embodying—besides historical and expository matter—examinations of the most notable recent discussions on the Cartesian positions. The old truths are presented in a fresh form; there are omissions, amendments, and additions, as compared with former Introductions; and by no means the least remarkable feature are the vigorous and trenchant criticisms, which always command respect even when they do not produce conviction. It is only a sketch, but so thorough and able in its way that one may be allowed to hope that we have here the forerunner of something more elaborate.

After opening with a brief account of the life and writings of Descartes, Prof. Veitch notes in a few succinct paragraphs the influences at work during the 15th and 16th centuries—"the volcanic epoch in European thought"—in preparing the way for the Cartesian advent. These influences, in great measure brought into play by the Renaissance, may be regarded as of four kinds. They were partly literary, partly speculative (as exemplified, for instance, in the philosophies of Bruno, Vanini, Campanella, and Ramus), partly observational and experimental (as seen in Copernicus, Kepler, Galileo, Bacon), and partly religious (manifested in the mysticism of the earlier, and the reforming spirit of the later, century). Emphasis has also to be

placed on the unprogressive nature of Scholasticism itself, and on the fact that, at the time of which we speak, its "inner spirit had pretty well worked itself out". The writer's own words may be quoted here:—"It was a body of thought remarkable for its order and symmetry, well knit and squared, solid and massive, like a mediæval fortress. But it was inadequate as a representation and expression of the free life that was working in the literature, and even in the outside nascent philosophy, of the time. It was formed for conservation and defence, not for progress. New weapons were being forged which must inevitably prevail against it, just as the discovery of gunpowder had been quietly superseding the heavy panoply of the knight."

The way for the exposition being cleared by these preliminary paragraphs, the start is now made (and naturally so) with the *Cogito ergo sum;* the handling of which extends over three sections (iii.-v.), and constitutes, to our thinking, one of the best parts of the Introduction. Section iii. treats of the nature and meaning of the principle; Section iv. of certain objections to it; and Section v. of its guarantee.

With respect to the first of these, Professor Veitch clearly shows—partly by appropriate quotations, and partly by sound reasoning—that the dictum is to be regarded, not as a syllogism, but as a proposition—a proposition intuitively apprehended: as he himself says, "it is what we should now call a proposition of immediate inference—such, that the predicate is necessarily implied in the subject." But if this be so, it would seem to follow that the *ergo* is a mere meaningless appendage: as Professor Huxley puts it, it has no business there. This, however, Dr. Veitch stoutly denies. He calls that view a "misrepresentation," and asserts that an immediate inference is still an inference. His words are:—"The 'therefore' has business there, as seems to me, until it is shown that immediate inference is no inference. The 'I am' is not assumed in the 'I think,' but implied in it, and explicitly evolved from it." Plainly the argument turns upon the word 'imply' here, and we must ask, What does that word signify? It cannot be identical with 'presuppose,' for it is part of Professor Veitch's case that the *cogito* of Descartes is in knowledge prior to the *existo;* the one does not 'assume' the other. Is it then synonymous with 'include' or 'contain,' so that the dictum, being interpreted, would run:—'My consciousness includes or contains my existence; just as a whole contains its parts, or a genus its species'? Then, in that case, 'my consciousness' and 'my existence' are for the moment convertible terms, and certainly the *ergo* has no business there. Or does it mean that the *sum* is only a part of what is contained in the *cogito?* Then it may be asked—Why is this part singled out rather than any other? Or, once more, does it signify, as Professor Veitch further on maintains, that my consciousness *reveals* my existence? Then the *ergo* is not illative at all, but instrumental, and the idea of 'evolving' is obviously inapplicable. The truth is, that there is a certain incompatibility between the terms 'imply' and 'evolve' on the one side, and 'immediate inference' and 'intuitively

apprehended' on the other; and only confusion results from the attempt to combine them.

This is still further apparent when we come to Professor Veitch's treatment of the objections. These, considered in his fourth Section, are mainly three:— Mr. Matthew Arnold's, Professor Bain's, and the old objection that the mind of man thinks always. The first is dismissed in a single paragraph; there is a rather elaborate handling of the last; but it is the treatment of the second that is unsatisfactory. Professor Bain had said that 'existence' standing by itself is a non-connotative term; or, to put it in the concrete form, that 'my existence' is an elliptical expression, and signifies nothing unless we unfold it and say—'I exist as a definite and precise something'. He had resolved 'existence' into some of the other attributes of things, and in particular he had referred to causation; he had maintained that 'I exist' is fully expressible by other terms, and is in reality intelligible only when translated into these. Now nowhere is this, so far as we can see, fairly met. There is much said on the alternative renderings, which Professor Bain himself regards as not expressing the thing intended, but nothing that runs face to face with the main issue. Moreover, there is a slight misrepresentation. When Professor Veitch, speaking of the *sum*, says:—"There is a twofold objection—one, that it is not a real inference; the other, that it is not a real proposition. It seems odd that it can be supposed possible for the same person to object to it on both of these grounds,"—he scarcely states the case correctly. What Professor Bain (to whom he here refers) regards as an unreal inference (See MIND, VI., p. 263) is the *sum* from the *cogito;* what he regards as an unreal proposition is the *cogito,* not the *sum.* And his object, as he says, for putting it in this way is, that thereby he may 'illustrate further the illogical character of the whole transaction'. It is scarcely strange that Professor Veitch should somewhat miss the mark in this controversy when he allows himself to confound "a real proposition" with "what is essential to a proposition"—two entirely different things.

Section v. introduces us to the guarantee of the principle. It may sound odd to speak of a guarantee for a principle that is intuitively apprehended; but we are relieved to find that, after all, the principle is its own guarantee; or, to phrase it differently, the guarantee is "intuition regulated by non-contradiction".

An admirable Section follows on the Criterion of Truth, in which we notice particularly the short vigorous criticism of Spinoza's 'Determination is negation'—the first sounding of a war-note that is heard again. Of the criterion itself the writer says:—"The most liberal, and probably the fairest, interpretation of the criterion of Descartes is that it is the assertion of the need of evidence, whatever be its kind, as the ground of the acceptance of a statement or proposition. As such, it is the expression of the spirit of the philosophy of Descartes, and of the spirit also of modern research."

Passing over the next three Sections, which treat respectively of "The Ego and the Material world," "Innate Ideas," "Malebranche,"

we enter at Section x. on that part of the Introduction which, next to the discussion of the *cogito*, will have the greatest interest for many, and which appears to us to be not only an opportune but a very valuable contribution towards the settlement of current problems. Through three sections a polemic is carried on; first with Spinoza and the Spinozists, next with Hegel and the Hegelians; and the importance attached to this portion of the essay by the writer himself may be gathered from the circumstance that the three sections under review occupy among them ninety-three pages—somewhat over the half of the whole.

In dealing with Spinoza, the first thing that the writer does is to enter his vigorous protest against regarding him as the legitimate successor of Descartes. "That he truly interpreted the main characteristic features of the philosophy of Descartes," he says, "or carried out its proper tendency, I emphatically deny." Elsewhere he maintains—"The logical successor of Descartes was certainly Leibnitz, not Spinoza." In handling his subject the course adopted is this:—He takes the Spinozistic method and compares it with the Cartesian, and finds as the result that the two are in diametrical opposition; instead of intuition and experience, we have a return to the scholastic abstraction and deduction. He next follows out the Spinozistic method into its applications, and shows, in considerable detail, the absurdities in which it lands. Broadly speaking, he claims to have established three things:—(1) That the Spinozistic method, misrepresenting as it does, and affecting to despise, the psychological, nevertheless leans upon the psychological for help, and is impotent without it; (2) that, when viewed in connexion with the full contents of consciousness, it involves itself in absolute contradiction; (3) that it is altogether powerless to deal successfully with either the physical or the metaphysical problem. These, there can be little question, are three weighty points, if thoroughly substantiated; and that they *are* thoroughly substantiated we certainly incline to believe. Our only objection is, that the writer has shown an excess of fire in the discussion, and permits himself the use of stronger condemnatory epithets than the circumstances warrant.

There is no abatement in the author's vigour when the polemic is pursued in Section xi. over the 'Omnis determinatio est negatio'; and the climax is reached in Section xii., when the discussion turns on "Hegelian Criticism—the Ego and the Infinite". This last section may be strongly commended to the attention of all who are interested in the Hegelian movement.

Perhaps we shall not do Professor Veitch an injustice if we represent his attitude towards Spinozism and Hegelianism somehow thus:—He regards them both as Sentiments rather than Philosophies (*Sentimentisms*—were we to coin a word), and as such unworthy of support. His objection to them is twofold. On the one hand, they are unphilosophical in character, being an abnegation of rationality; on the other hand, they are hurtful in practice, being opposed to the best and highest interests of mankind. They are vicious speculatively and

they are vicious ethically, and, instead of being a progress or a development, they are both retrograde movements—"relapses into the antiquated verbalistic thought"—in great measure "caricatures" of the truth.

WILLIAM L. DAVIDSON.

The Religion of the Future. By JOHN BEATTIE CROZIER, M.B. London: Kegan Paul, 1880. Pp. 290.

Mr. Crozier's work consists of five separate essays, entitled respectively "Carlyle," "Emerson," "Herbert Spencer," "Considerations on the Constitution of the World," and "God or Force?" The two first-named papers, which occupy more than half the volume, lie for the most part outside the sphere of this journal. They consist of patient and generally eulogistic analyses of Carlyle's and Emerson's opinions upon all subjects, religious, political, and social. The other three may fairly be classed as philosophical in intent. The object of the whole work, Mr. Crozier tells us in his preface, is "to separate as far as possible the non-essential and transitory elements of Religion from the essential and perennial, and to give to these latter a consistent and enduring form, a form that will satisfy the feelings of the heart, while resting on the strictest inductions of science". Around this Religion of the Future, Mr. Crozier "hopes to unite religious thinkers of all classes in a common stand against Materialism and Atheism". The new creed appears mainly to consist in a shadowy idealistic Theism, almost as attenuated as that proclaimed by Mr. Matthew Arnold or Mr. Carlyle himself.

The essay on "Herbert Spencer" contains an examination and criticism of *First Principles.* After analysing that work, Mr. Crozier finds that Mr. Spencer identifies the Absolute Reality with the Persistence of Force, a statement which recurs so frequently that it cannot be due to mere oversight. It is, however, entirely misleading, as Mr. Spencer really identifies the Absolute Power underlying the universe, not with the Persistence of Force, but with the Force itself whose persistence he asserts to be tacitly assumed in all acts of reasoning. Mr. Crozier then goes on to argue, "firstly, that the Persistence of Force is *not* the basis of Science, and that the Law of Evolution is *not* a corollary from it; secondly, that it is *not* the Absolute Power of which the Universe is a manifestation, and that it is *not* the object of religious worship". He endeavours to show that Mr. Spencer's reasoning under the first head really proceeds, not upon the persistence of force, but upon a *fixed quantity* of force, or upon a fixed quantity of matter. This appears to be one of those numerous objections which have resulted from the fact that physical terminology was in a transitional state when *First Principles* originally appeared, and that the Conservation of Energy had not yet been accurately distinguished from the constancy of those Forces (such as gravitation) which are now more or less definitely distinguished from Energies by the later

school of physicists. The whole class of adverse criticisms thus aroused would probably have been avoided had Mr. Spencer employed a neutral term, such as 'Indestructibility of Power'. Under the second head, Mr. Crozier asserts that Mr. Spencer "having in one half of the book used the Persistence of Force as simply the *sum-total* of the forces of Nature, in the other half uses it as the *Cause* of these forces," and so illegitimately identifies it with the object of worship. Finally, the critic thus sums up Mr. Spencer's theory, when stripped of its supposed disguises:—"The Universe consists of a *fixed* quantity of matter, which has existed *from all eternity*, which is *indestructible*, and which, through the antagonistic forces that compose it, *itself necessitates* the changes passed through and still going on". This, he says, is "the old atheistic theory": it is "simply that of self-existent matter, and is open to Mr. Spencer's own criticism that it is impossible to think or conceive a self-existent Universe". But Mr. Crozier apparently forgets that Mr. Spencer finds Theism and Pantheism also equally unthinkable; and we should have thought it sufficiently obvious that of the three unthinkables Mr. Spencer's own turn of thought (if he had to choose among them) would lead rather to Pantheism than to Atheism.

Mr. Crozier then proceeds to state his counter-theory, which is a systematic and theistic Carlylism. He rejects the antinomies adduced to exemplify the limitations of human understanding (such as the impossibility of conceiving space as either finite or infinite), and decides in favour of universal finiteness, in which verdict he seems to include even his First Cause. "Matter and space being finite, there is no reason for supposing the First Cause to be Infinite. It is enough for us,—poor, wandering light-gleams cast upon this latest wave of time—to be permitted to behold, and for a moment to enjoy, this incomparable panorama of Nature, and, lifting our eyes above, to know it has a commensurate Cause, and humbly worship there." The universe is next explained by a Carlylian idealism as a sort of *idolon*, projected apparently by the human mind itself. "As the constitution of the senses makes the *material* world, and the constitution of the sentiments the *social* and *moral* world; so the constitution of the intellect makes the *Laws of Nature*." Accordingly, even the existence of the First Cause is warranted to us by "the intuition of Causation," while "the scale of Sensations demands that the *attributes* of this Cause shall be commensurate with the dignity of the human mind". "The materialists put the cart before the horse. The Laws of Nature do not create the mind of man, but the mind of man is created to perceive, among other things, the Laws of Nature". As to the mode of creation, Mr. Crozier is singularly silent. Some of his remarks concerning his First Cause, however, seem to point towards a very impersonal Deity, and remind one strongly of the 'stream of tendency which makes for righteousness'. "There is in Nature and the Human Mind," he says, "a *Public Element* which works for universal, and not particular, ends. . . . A glance over the animal and vegetable world reveals the existence of a Power which

works for the general good. This is seen in the proportion which is everywhere kept between animal and vegetable life, thus preserving the proper composition of the atmosphere. It is seen in the proportion kept among the different races of animals, by the balance between the powers of aggression and defence." But surely a little elementary Darwinism would show Mr. Crozier that the absence of such proportion is physically inconceivable: while it is a novel doctrine to enforce the dogma of Divine Beneficence by the claws of the tiger, the sting of the scorpion, and the admirably defensive poison of the upas tree. In spite of such shadowy language, Mr. Crozier's Deity often appears as apparently personal and creative. For example—"These intuitions and feelings are *fixed and unchanging*, are there by the will of God, and cannot be explained at all." On the other hand, there are some passages which seem to bespeak the most indefinite pantheism, such as the following: "And now we may see why the Cause of the Universe is moral. Because, although it is *consciously* present only in the mind of man, it appears everywhere in Nature in objects that have no Moral Sense. It is the *public element*, which we saw not only in the Moral Sentiment in man, but in the provision that is made to keep every leaf, every plant, every tree, and every animal in strict subordination to the welfare of the whole."

Altogether, Mr. Crozier's meaning is not so clear as might be wished. He is fond of that kind of mysticism which consists in producing the illusion of an explanation by the employment of vague but high-sounding language. His work seems hardly adapted to present needs. It might have secured attention during the earlier days of Carlyle's vaticination, but it fails to satisfy minds accustomed to the rigorous physical or logical conceptions of later thinkers.

GRANT ALLEN.

VIII.—NEW BOOKS.

[*These Notes are not meant to exclude, and sometimes are intentionally preliminary to, Critical Notices of the more important works later on.*]

The Brain as an Organ of Mind. By H. CHARLTON BASTIAN, M.A., M.D., F.R.S., Professor of Pathological Anatomy and of Clinical Medicine in University College, London. With 184 Illustrations. The International Scientific Series. London: Kegan Paul, 1880. Pp. 708.

Dr. Bastian has supplied the following statement of the scope of his work:—

"After pointing out the uses of Nervous Systems and the fundamental nature of that portion known as the Brain, the author briefly discusses the nature and mode of arrangement of Nerve-elements generally. He then proceeds, in a series of intermixed chapters, on the one hand to explain the leading types and variations in the brains of lower animals, and on the other to consider (by the light derived from well-authenticated instances of

the acts of lower animals) something of the nature and degree of complexity of their mental processes. It is shown, on the one side, how the brains of animals, and especially those of the Quadrumanous series, lead on to the structural conformations met with in the brain of Man, and on the other how the mental processes occurring in men have their rudimentary correlatives in the mental processes of animals. The anatomy of the human brain is more fully considered, and the tracks for ingoing and for outgoing impressions in their passage through the organ are indicated as fully as our present knowledge will admit. Modern doctrines of localisation are discussed and reasons are advanced for a disbelief in the existence of 'Motor Centres' in the cerebral cortex. The author also sums up the evidence for and against 'Muscular Sense' impressions being concomitants of outgoing currents. In dealing with the human brain as an organ of Mind, he has striven to explain the nature of the evidence concerning the localisation of Thought-processes derivable from the study of diseases during life and morbid brain-changes after death, and has shown what light may be thrown upon this part of his subject by the investigation of cases in which Thought and Speech have been variously interfered with. The author discusses the scope of 'Mind' from the modern scientific standpoint, and has endeavoured to show, within the limits of a volume addressed to the general public, to what extent the Science of Mind reposes upon Subjective Psychology, Objective Psychology and Neurology respectively."

An Introduction to the Philosophy of Religion. By JOHN CAIRD, D.D., Principal and Vice-Chancellor of the University of Glasgow. Glasgow: Maclehose, 1880. Pp. 358.

Critical notice of this work is unavoidably deferred. The substance of it was delivered in Edinburgh as the Croall Lecture for 1878-9. The author, however, has not deemed it necessary to retain the form of lectures, finding that it gives rise to arbitrary divisions and interruptions of the continuity of thought. After Preliminary Remarks on the function of Philosophy, he first considers the Objections to the Scientific treatment of Religion (*a*) from the relative character of Human Knowledge, (*b*) from the immediate or intuitive character of Religious Knowledge, and (*c*) from its authoritative character; and then in succession treats of the Necessity of Religion, the Proofs of the Existence of God, the Religious Consciousness, Inadequacy of Religious Knowledge in the Unscientific Form, Transition to Speculative Idea of Religion, the Religious Life (Relation of Morality and Religion), Relation of the Philosophy to the History of Religion.

The Moral Philosophy of Aristotle: consisting of a Translation of the *Nicomachean Ethics* and of the *Paraphrase* attributed to Andronicus of Rhodes, with an Introductory Analysis of each Book. By the late WALTER M. HATCH, M.A., Fellow of New College, Oxford, &c. Completed after his death by Others. London: Murray, 1879. Pp. 589.

The translator, already known as editor of the first volume of Shaftesbury's *Characteristics* (1870), died suddenly in 1877, at the age of 33, leaving the present work unfinished beyond Books i.—vi. It has been completed by some of his friends, who thought well of the

scheme and of its execution and considered the book likely to be useful especially to students at the Universities.

"Its aim is to make the *Nicomachean Ethics* of Aristotle intelligible to a modern reader. It endeavours to do so chiefly by modifying the style in which the original is written. . . . Missing links of thought have been inserted; hints which were contained in brief condensed phrases have been expanded; that which was in some cases an unapparent inference beneath the surface has been brought into the light. . . . . But no additions have been made to Aristotle's statements and no inferences have been inserted which his words do not immediately imply. Three other kinds of help are offered to the student: (1) Every Book is preceded by an analysis of its contents . . . . in the form in which they might be stated by a modern writer. (2) The chapters and sections into which the Greek text has been divided, have been disregarded, and new divisions and subdivisions have been made . . . . (3) To each section of the text of Aristotle has been added a translation of the best known of existing Greek paraphrases . . . . in lieu of a commentary."

Outlines of the Philosophy of Aristotle. Compiled by EDWIN WALLACE, M.A., Fellow and Tutor of Worcester College, Oxford. Second and considerably enlarged Edition. Oxford and London: Parker, 1880. Pp. 70.

This is an expansion of a smaller work published with the same title in 1875, mainly for use by the author's pupils. As Zeller's volume on Aristotelianism is being translated into English, he has not thought it well to expand in the sense of "writing out". The form of "Outlines" is still retained, by giving with the more important passages in Aristotle's writings (in the original Greek) only a brief English analysis, for explanation and in place of context. After a short Introduction, biographical and bibliographical, the analyses and extracts are presented under the following heads in order: Logic, Metaphysic, Philosophy of Nature, Psychology, Moral and Political Philosophy, Philosophy of Art; with Index at the end. Within small compass, the work is very thoroughly done. Naturally, the physical and physiological treatises are least drawn upon (being disposed of in some six pages): their varied contents do not admit of short presentation and are now less important in themselves. But, as the author urges—

"We are still anxious to know whether our perception of a real world comes to us by an exercise of thought or by a simple impression of sense—whether it is the universal that gives the individual reality or the individual that shapes itself, by some process not explained, into an universal—whether bodily movements are the causal antecedents of mental functions or mind rather the reality which gives truth to body—whether the highest life is a life of thought or a life of action—whether intellectual also involves moral progress—whether the state is a mere combination for the preservation of goods and property or a moral organism developing the idea of right. And about these and such like questions Aristotle [in his moral and metaphysical works] has still much to tell us."

The Manual of Budhism, in its Modern Development. Translated from Singhalese MSS. By R. SPENCE HARDY, Author of *Eastern Monachism*, &c. Second Edition. London: Williams & Norgate, 1880. Pp. 566.

"The present volume having been out of print for some time, the demand for it, however, still being so great that copies have been sold in public sales for several pounds, the publishers have been induced to reprint a small edition of the work. They have taken the opportunity of correcting a few errors and adding a much more complete Index, which has been kindly compiled by Dr. Frankfurter of Berlin, who is pursuing Pali studies in London. In every other respect the present is an exact reproduction of the first edition."

Degeneration. A Chapter in Darwinism. By Prof. E. RAY LANKESTER, F.R.S. *Nature* Series. London: Macmillan, 1880. Pp. 75.

The author argues (after Dr. A. Dohrn of Naples) that Degeneration, as well as Balance or Elaboration, may follow from the play of Natural Selection. The hypothesis of Degeneration, when applied generally, instead of being applied as by naturalists hitherto only to the case of parasites, will, he believes, "be found to render most valuable service in pointing out the true relationships of animals which are a puzzle and a mystery when we use only and exclusively the hypothesis of Balance or the hypothesis of Elaboration." Degeneration may be brought on by parasitism, or immobility, or vegetative nutrition, or extreme reduction of size. After illustrating his thesis from various cases of the lower animals, especially the ascidians, the author at the end touches briefly on Degeneration in man, as shown in barbarous races and possibly also in modern Europeans:

"As compared with the immediate forefathers of our civilisation—the ancient Greeks—we do not appear to have improved so far as our bodily structure is concerned, nor assuredly so far as some of our mental capacities are concerned. Our powers of perceiving and expressing beauty of form have certainly not increased since the days of the Parthenon and Aphrodite of Melos. In matters of the reason, in the development of intellect we may seriously inquire how the case stands. Does the reason of the average man of civilised Europe stand out clearly as an evidence of progress when compared with that of the man of bygone ages? Are all the inventions and figments of human superstition and folly, the self-inflicted torturing of mind, the reiterated substitution of wrong for right, and of falsehood for truth, which disfigure our modern civilisation—are these evidences of progress? In such respects we have at least reason to fear that we may be degenerate. Possibly we are all drifting, tending to the condition of intellectual barnacles or ascidians."

In these remarks, the author is somewhat too indiscriminate. If we have degenerated from Greek days, it is hardly in "intellect," or in morality either. The interesting question, from the point of view of Evolution, is whether the intellectual and moral progress could not have been attained except at the expense of the ancient joy in life and power of artistic creation. In the conditions of human nature, perhaps it was not possible.

Elementary Notions of Logic. Being the Logic of the First Figure, designed as Prolegomena to the Study of Geometry. By ALFRED MILNES, M.A. (Lond.) London: Swan Sonnenschein & Allen, 1880. Pp. 112.

This little book "purports to be not so much a contribution to logical science itself as to the art of teaching it". The author thinks "that a small area of the subject should be first mapped out and treated as completely as possible, then the boundaries of this area enlarged, and the new area as completely treated again". For the first area he has chosen so much of Logic as seems to him to be necessary to a just appreciation of the First Book of Euclid. The treatment is not without freshness when the author is dealing with special modes of demonstration like the Argument *a fortiori*, *Reductio ad absurdum*, &c., as presented in geometrical science. The account of Contraposition and related processes might be improved in itself, and might have received the kind of application that has been introduced into some recent manuals of elementary geometry. With his special object in view, it is a little surprising that the author should have neglected this opening.

Some Thoughts concerning Education. By JOHN LOCKE. With Introduction and Notes by the Rev. R. H. Quick, M.A. Trin. Coll. Camb. 'Pitt Press Series'. Cambridge: University Press, 1880. Pp. 240.

Some Thoughts concerning Education. By JOHN LOCKE. With Introduction and Notes by the Rev. Evan Daniel, M.A., Principal of the National Society's Training College, Battersea. London: Nat. Society's Depository, 1880. Pp. 364.

These two editions of Locke's classical *Thoughts* were independently projected to meet the present demand among teachers for guidance in their work, and more especially with reference to the requirements of the Teachers' Examination newly instituted by the University of Cambridge. Both Editors have done their work very carefully. Canon Daniel relies to some extent on earlier commentators, but is also able to illustrate his subject from the works of the latest authorities on educational theory and practice. Mr. Quick, as was to be expected from one who is himself an authority in the history of Education, throws valuable light on Locke's relation to his predecessors in the field of educational theory, especially Montaigne. A particularly interesting feature of the Cambridge edition are the notes on medical points contributed by Dr. J. F. Payne, who brings to the interpretation of Locke's professional injunctions a rare acquaintance with the history of Medicine, as well as to the criticism of them the knowledge of a trained physiologist.

Evolution and Involution. By GEORGE THOMSON. London: Trübner, 1880. Pp. vii. 205.

This is a somewhat mystical work, directed against Mr. Darwin and Mr. Herbert Spencer, in the interests of an indefinite sort of

Christianity. It consists chiefly in an exposition of what the author calls the Law of Evolution and Involution, which he formulates as follows :—

"THE LAW OF EVOLUTION AND INVOLUTION is that *all beings in proportion as they assume personality and* EVOLVE *out of the universe, in that proportion do they* INVOLVE *it within themselves and incorporate it, approaching at the same time absolutism in all its attributes.*"

So far as we can judge, the law amounts merely to the statement that every being can only understand as much of the universe as it understands, and that the higher animals understand more of it than the lower. "Evolution, as explained by Mr. Darwin and his followers and associates," Mr. Thomson expressly rejects. His standpoint is apparently that of a christian pantheist, who disbelieves in the hypothesis of development and accepts that of direct creation in a mystical form, as presentation or self-realisation of the Deity. The following extracts will best express his position :—

"This eternal and indestructible thing which is to us the universe, is not to the pebble, is sentiently to the flower, is materially to the lower animal, is ideally to the man, and *is* to an Absolute Being. . . . If the race of men, however, were extinct or annihilated, there would be no universe as it is to man ; yet it would be, and that eternally. In other words, it is as much of God as we can see ; for it is the face of God tinged, and limited by, idea, which is of man. It is the mode in which we see God ; but if we were absolute and complete personalities, we would be as God, and would not be God, and yet would be God ; and the universe, in its actuality and potentiality, in accordance with the principles of the Law of Evolution and Involution, would be ourselves, and we would be the universe." [G. A.]

The Spirit of Nature. By HENRY BELLYSE BAILDON, B.A., Cantab. Member of the Pharmaceutical Society, Author of "Morning Clouds," "Rosamund, a Tragic Drama," &c. London: Churchill, 1880. Pp. xv., 216.

Mr. Baildon reproduces in this volume a series of Lectures delivered before the Pharmaceutical Society in Edinburgh. He attacks the Darwinian theory of Natural Selection, while admitting the "possibility" of Evolution in some form. Beginning with chemistry, he endeavours to show that the chemical molecule itself bears marks of "intelligent creation". Passing on to botany, he argues that physical and chemical laws are insufficient for the production of vital phenomena. Evolution must have been guided and directed by a superior Intelligence. The botanical argument forms by far the larger portion of the volume, but displays rather a poetical than a scientific spirit. The last chapter deals with the alleged cruelty of nature, which Mr. Baildon combats partly on the ground that pain is necessary, and partly on the ground that most of the lower animals either feel very little or are anæsthetised by excitement during struggles or narcotised by special provisions of nature. [G. A.]

Zur Theorie der Wechselwirkung zwischen Leib und Seele. Von C. S. Cornelius. Halle: Nebert, 1880. Pp. 90.

This is a series of short discussions of problems in the physiology of vision, hearing, attention, &c., with a view to show the congruity of the phenomena with a Herbartian conception of matter and mind and their relation one to another. A number of interesting points are touched on, including the physiological conditions of the sensations of white, black, &c., the perplexing phenomena of optical contrast, the functions of the different nervous appendages of the ear in relation to the perception of tone, noise, &c., Fechner's psychophysical law, the relation of attention to sensation, and the causes of sleep and dreams. The author presents the newest facts under each head, and subjects the theories of different physiologists, including Helmholtz, Fechner, Hering, and Exner, to a thoughtful criticism. The relation of the Herbartian principles with which he sets out to the phenomena investigated is not always very manifest. Indeed it may be said that the chief value of this little work is quite independent of that of its metaphysical basis, and consists in the clear though brief account of a number of those interesting researches in physiological psychology with which the German physiologists are now busying themselves, as well as a consideration of the various modes of interpreting the facts suggested by these investigators. [J. S.]

Studien über die Sprachvorstellungen. Von Dr. S. Stricker, Universitäts-Professor in Wien. Mit 3 Holzschnitten. Wien: Braumüller, 1880. Pp. 106.

Prof. Stricker has been moved, through doubts lately cast by Prof. Delboeuf on the theory of illusions (as involving the function of peripheral nerves) set up in his *Studien über das Bewusstsein* (Mind XIV., 293), to investigate more particularly the nature of our mental representation of Words. The investigation is conducted with all his characteristic care and candour, and ends in the result that verbal representation is essentially a representation of muscular acts determined from within outwards. Prof. Bain, to whom Dr. Stricker refers at second hand, took up this position long ago, but nobody before Dr. Stricker has so carefully distinguished between laryngeal movements and those acts of articulation proper which are the really important ones in actual or represented speech. On another occasion we may draw more particular attention to Dr. Stricker's results. Let it suffice meanwhile to say that his little treatise should be overlooked by no psychologist concerned either in the special question of Speech or in the general question of the "Muscular Sense".

Spinoza: his Life and Philosophy. By Frederick Pollock. With Portrait. London: Kegan Paul. 1880. Pp. xli. and 467.

"The appearance of this book, which in other respects is ready for publication, is *postponed* to the autumn season by unavoidable delay in the execution of the frontispiece, which is to be a reproduction of the engraved

portrait of Spinoza found in many copies of the *Opera Posthuma*, but rare in this country. It is preceded by a biographical introduction, giving particulars of some early notices of Spinoza, especially in England, not mentioned in Van der Linde's bibliography of the subject, and of recent translations and other works. The general object is to put before English readers an account, fairly complete in itself and on a fairly adequate scale, of the life and philosophy of Spinoza. The book aims, in the first instance, at being understood by those who have not made a special study of the subject; but it may also not be useless to some who already know Spinoza at first hand, and even to critical students of philosophy. The two first chapters are given to Spinoza's life and miscellaneous letters, and the last one to a sketch of the reception and influence of his work down to the present time. The rest of the book explains and discusses his philosophy. Some special attention is paid to the comparison, from the point of view of the English school of jurisprudence, of Spinoza's political theory with that of Hobbes. A certain number of important passages from the *Ethics*, including the whole of the appendices to Parts III. and IV., are translated. The old English version of the Life of Colerus is reprinted as an appendix, and the Latin text of an original letter of Spinoza's in Victor Cousin's library is printed for the first time."

IX.—MISCELLANEOUS.

THE FOLLOWING is an abstract of the Inaugural Lecture delivered by Professor J. B. Mayor at King's College, London, on April 28. Taking as his subject the question 'What is the good of Moral Philosophy?' Prof. Mayor summed up the popular objections to this study under three heads; (1) It tells us nothing new, but merely formulates truisms; (2) It busies itself with speculative questions, and is of no use for practice; (3) All other moral teaching is superseded by Revelation. After expressing a qualified assent to objection (2), as far as it referred to the actual procedure of modern writers on ethics, he went on to examine objection (3), and asked what was to be done with those who did not accept Revelation; were they to be declared incapable of morality? He pointed out that to base morality on religion was to invert the logical order, since our moral instincts formed the main foundation of our belief in a God as in a revelation professing to be divine; that the Bible itself presupposed a knowledge of right and wrong; that in many points the moral teaching contained in the Bible was either transitional (*e.g.*, the prohibition of usury, and of things strangled), or incomplete (as in reference to slavery); that in any case Moral Philosophy was needed in order to systematise, to develop and to apply the teaching contained in Scripture. Turning to objection (1), he remarked that it assumed the existence of one recognised rule of life and theory of conduct, but if we looked not to words but to actions, we should see that there was no such uniform theory of conduct: the ideals of happiness, duty and virtue, varied for different races, periods, classes and ages. It was the office of 'descriptive ethics' to bring into clear light the views half-consciously held by those who were not philosophers. Some of these views had been systematised and become recognised ethical theories,

as the cavalier's or soldier's view in the code of honour, the lawyer's view in jurisprudence or the theory of right. The study of descriptive ethics was not merely of interest in itself, it was practically useful as supplying data for our own guidance. To know what, as a fact, men have believed and acted on under varied conditions of life during the past ages of the world, will help to determine the rule of conduct for the small fraction of humanity which happens to occupy the earth at this moment. Passing to practical ethics, we find modern life governed partly by old traditions, partly by novel theories propounded as so many new gospels by their several schools. It is the office of Moral Philosophy to bring them all before the bar of reason, to strip them alike of venerable associations or pretentious assumption, and exhibit the underlying principles in their naked reality. Whatever the question raised may be, when it once takes the form 'Ought I to do this thing or ought I not?' the ultimate decision rests with ethics. Particular sciences, such as medicine or political economy or theology, may be called in to give their evidence as to the facts involved in any case; but the ethical end, which is the perfection of humanity, necessarily overrides every subordinate end. Besides its descriptive and judicial functions Moral Philosophy has a no less important work of discovery, to advance the lines of ethical thought, to devise new means for promoting the upward progress of humanity. This branch of the subject was illustrated by a reference to various ethical desiderata, *e.g.*, the determination of the relation between absolute and relative ethics, between ethics and politics, between ethics and political economy, the establishment of a scientific theory of education, &c.

A SCHEME proposed by the Board of Moral Sciences Studies for modifying the regulations of the Moral Sciences Tripos has recently been confirmed by the Senate of the University of Cambridge. According to the old regulations, candidates were examined in the four following subjects—Moral and Political Philosophy, Psychology and Metaphysics, Logic, Political Economy; and practically it was necessary to take up all four subjects in order to obtain a first class. The object of the change now instituted is to permit and encourage a certain degree of specialisation in the students' reading; and it is anticipated that incidentally the Tripos will be made more attractive to students who have already taken honours in another subject, *e.g.*, to those who have taken Classical Honours, and who have in connexion with that Tripos already devoted considerable attention to the problems of Ancient Philosophy. Under the new regulations, the examination will consist of two parts. In the first part, the subjects are Psychology, Logic, Metaphysics, Moral and Political Philosophy, and Political Economy; and in addition to papers on these subjects there will be one paper set containing questions in General Philosophy. Candidates will not, however, be examined in more than five out of these six papers. In this part it is intended that the questions set shall be of a more elementary, or at

least of a more general character; whilst in the second part more advanced or more detailed knowledge will be required. In this second part there are to be six subjects of examination, three historical, *viz.*, History of Ancient Philosophy, History of Modern Philosophy, and History of Modern Political Philosophy and Economic Theory; and three theoretical, *viz.*, Advanced Psychology, Advanced Logic, and Advanced Political Economy. But candidates must confine their attention to *two* out of these six subjects. In this way it is hoped that sufficiently free play will be allowed to individual tastes and faculties without sacrificing the distinctive character of the Moral Sciences Course, or impairing the thoroughness of the work of the students. It may be added that now that alternative papers are allowed to be taken, it is decided to abolish the system of placing candidates in order of merit in their respective classes. Marks of distinction will, however, be affixed to the names of those who have shown eminent proficiency in particular subjects.

It is announced by the Spinoza Committee at the Hague that the statue of Spinoza will probably be completed and in its place in the month of August. The unveiling will take place on or about the 1st of September, and foreign subscribers and members of local sub-committees are invited to attend.

Professor Bain has retired from the Chair of Logic in the University of Aberdeen, being advised, after twenty years of service, to seek release from the strain of teaching.

The Journal of Speculative Philosophy.—Vol. XIV. No. 2. 'Schelling on Natural Science' (tr.). 'Kant's Anthropology' (tr.). 'Hermann Grimm on Raphael and Michael Angelo' (tr.). 'Rosenkranz on the Science of Education' (paraph.). J. Albee—'Ars Poetica et Humana'. J. H. Gulliver—'The Psychology of Dreams'. T. Gray—'Laws of Creation—Ultimate Science'. W. T. Harris—'Educational Psychology (Outlines)'. Notes and Discussions. Book Notices.

Revue Philosophique.—Vme Anée, No. 4. A. Fouillée—'Vues synthetiques sur la sociologie'. B. Perez—'Le developpement du sens moral chez le petit enfant'. J. Delboeuf—'Le sommeil et les rêves' (iv.). Notes et Documents (Ch. Richet—'De l'influence des mouvements sur les sensations'. J. Boussinesq—'Sur l'impossibilité d'arriver aux notions géométriques par une simple condensation des résultats de l'expérience'.) Analyses et Comptes-rendus (W. K. Clifford, *Lectures and Essays*, &c.) Rev. des Period. No. 5. H. Lotze—'L'infini actuel est-il contradictoire? Réponse à M. Renouvier'. J. Sully—'Les formes visuelles et le plaisir esthétique' (tr. from Mind XVIII). Th. Ribot—'La mémoire comme fait biologique'. Notes et Docs. (V. Brochard—'Descartes stoicien'). Analyses, &c. Notices bibliographiques (R. Adamson, *On the Philosophy of Kant*, &c.) Rev. des Period. No. 6. F. et R.—'Considérations sur la philosophie chimique'. J. Delboeuf—'Le sommeil et les rêves' (fin). D. Nolen—'La critique de Kant et la religion'. Notes et Discussions (Ch. Renouvier—'Réponse à M. H. Lotze'). Analyses, &c. Notices bibl. (Clifford, L. Lindsay, Harper, Balfour, Cyples, &c.). Rev. des Period.

La Critique Philosophique.—IXme Année, Nos. 6-18. J. Milsand—'Une causerie: comment se forment les convictions qui influent sur la vie'

(6); 'Les sentiments et les idées' (7, 9); 'Le physique et le moral' (13, 14); 'La psychologie et la physiologie' (18). C. Renouvier—'Les labyrinthes de la metaphysique: Le libre arbitre selon les épicuriens et le commentaire de M. Guyau' (8); 'Le fétichisme, sa définition, sa place dans l'histoire des religions' (9); 'De la source psychologique du fétichisme, de la sorcellerie, de la magie et de l'astrologie' (10, 14). F. Pillon—'L'enseignement de la philosophie dans les lycées' (10); 'Une étude récente sur Locke et sa philosophie: H. Marion, *J. Locke, sa vie, &c.*' (11).

La Filosofia delle Scuole Italiane.—Vol. XXI. Disp. 1. F. Bonatelli—'Del Sogno'. T. Mamiani—'Della filosofia francese contemporanea'. F. Ramorino—'Di alcune argomentazioni contenute nel Protagora di Platone'. Bibliografia, &c. Disp. 2. T. Mamiani—'Sulla psicologia e la critica della conoscenza, prima lettera al prof. Sebastiano Turbiglio'; F. Tocco—'L'analitica transcendentale e i suoi recenti espositori'. M. Panizza—'Antropologia: La fisiologia del sistema nervoso nelle sue relazioni coi fatti psichici'. Bibliografia, &c.

Zeitschrift für Philosophie, &c. Bd. LXXVI. Heft 2. W. Wiegand—'Leibniz als Religions-Friedenstifter' (ii.). E. Rehnisch—'Zur Kritik herkömmlicher Dogmen u. Anschauungsweisen der Logik, insbesondere des Lehrstücks vom Schluss' (Forts.). Recensionen. Bibliographie.

Zeitschrift für Völkerpsychologie u. Sprachwissenschaft. Bd. XII., Heft 1. F. Misteli—'Lautgesetz u. Analogie: Methodisch-psychologische Abhandlung' (Schluss). O. Flügel—'Ueber die Entwickelung der sittlichen Ideen'. Beurtheilungen.

Vierteljahrsschrift für wissenschaftliche Philosophie. Bd. IV., Heft 2. C. Semper—'Ueber die Anwendbarkeit der monophyletischen u. polyphyletischen Abstammungs-hypothese'. E. Laas—'Die Causalität des Ich' (ii.). J. Bergmann—'Idealistische Differenzen, &c.: Eine Entgegnung'. Recensionen. Selbstanzeigen.

Books, &c., received besides those noticed above:—J. C. Bucknill, *The Care of the Insane*, London (Macmillan), pp. 133; G. Curtius, *The Greek Verb*, Trans. by A. S. Wilkins and E. B. England, London (Murray), pp. 585; R. Ward, *The Constitution of the Earth*, London (G. Bell), pp. 383; W. A. Hunter, *Introduction to Roman Law*, London (Maxwell), pp. 209; *Social Rights*, Glasgow (Aird and Coghill), pp. 208; G. Mallery, *Introduction to the Study of Sign Language among the North American Indians*, Washington (Govt. Printing Office), pp. 72; H. Marion, *Franciscus Glissonius quid de Natura Substantiae seu Vita Naturae senserit*, Lut. Par. (Baillière), pp. 136; H. Marion, *De la Solidarité Morale*, Paris (Baillière), pp. 336; C. A. Du Péan, *Recherches sur la Nature de l'Homme*, Paris (Ghio), pp. 89; G. Barzelloti, *La nuova Scuola del Kant*, Roma (Barbèra), pp. 40; B. Giovanni, *L'Educazione &c., secondo il Metodo naturale*, Torino (Vinciguerra), pp. 227; P. Siciliani, *La Scienza dell' Educazione &c.*, Bologna (Zanichelli), pp. 204; W. Wundt, *Der Aberglaube in der Wissenschaft*, Leipzig (Brockhaus), pp. 24; A. Anderssohn, *Die Theorie vom Massendruck aus der Ferne*, Breslau (Trewendt), pp. 71; A. Bilharz, P. Dannegger, *Metaphysische Anfangsgründe der math. Wissenschaften*, Sigmaringen (Tappen), pp. 97; H. Höffding, *Die Grundlage der humanen Ethik*, aus dem Dänischen, Bonn (Strauss), pp. 107; A. Marty, *Ueber den Ursprung der Sprache*, Würzburg (Stuber), 1876, pp. 150; H. Kronecker, G. Stanley Hall, *Die willkürliche Muskelaction*, Leipzig (Metzger), 1879, pp. 37; G. S. Hall, J. v. Kries, *Ueber die Abhängigkeit der Reactionszeiten vom Ort des Reizes*, Leipzig (Veit), 1879, pp. 10.